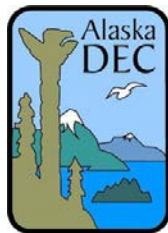




**FINAL REPORT FOR  
FOCUSED GROUNDWATER  
CHARACTERIZATION  
ALASKA REAL ESTATE PARKING LOT  
ANCHORAGE, ALASKA**

**ADEC SPAR TERM CONTRACT #18-8036-13  
SEPTEMBER 16, 2014**

**Prepared For:**



**Alaska Department of Environmental Conservation  
Division of Spill Prevention and Response  
555 Cordova Street  
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**APPROVAL PAGE**

This focused groundwater characterization report for the Alaska Real Estate Parking Lot site in Anchorage, Alaska has been prepared for the Alaska Department of Environmental Conservation by Ahtna Engineering Services, LLC, with support from its teaming partner Geosyntec Consultants, Inc.

ADEC Site Name: Alaska Real Estate Parking Lot  
ADEC File No: 2100.38.434

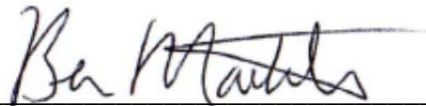
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## **ACRONYMS AND ABBREVIATIONS**

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
Ahtna	Ahtna Engineering Services, LLC
AREPL	Alaska Real Estate Parking Lot
ARRC	Alaska Railroad Corporation
bgs	below ground surface
°C	degrees Celsius
cDCE	cis-1,2-dichloroethene
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
COPC	contaminant of potential concern
CORS	Continuously Operating Reference Station
CSIA	compound specific isotope analysis
CSM	conceptual site model
1,1-DCE	1,1-Dichloroethene
<i>Dhc</i>	<i>dehalococcoides</i>
DO	dissolved oxygen
DRO	diesel-range organics
E&E	Ecology and Environment
EPA	Environmental Protection Agency
GeoTek	GeoTek Alaska, Inc.
GRO	gasoline-range organics
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
µg/L	microgram per liter
µS/cm	microSiemen per centimeter
MDL	method detection limit
mg/L	milligram per liter
ML&P	Municipal Light and Power
MNA	monitored natural attenuation
MS	matrix spike
MSD	matrix spike duplicate
mV	millivolt
MW	monitoring well
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
ND	non-detect
ORP	oxygen reduction potential
PCE	tetrachloroethene
PDB	Pee Dee Belemnite
PQL	practical quantitation limit
PVC	polyvinyl chloride
QC	quality control
RCRA	Resource Conservation and Recovery Act

RPD.....relative percent difference  
SDG.....sample delivery group  
SMOC .....Standard Mean Ocean Chlorine  
TCE .....trichloroethene  
tDCE .....trans-1,2-dichloroethene  
USGS .....United States Geological Survey  
VC .....vinyl chloride  
vcrA.....vinyl chloride reductase  
VOCs.....volatile organic compounds  
YSI .....Yellow Springs Instruments



## **1.0 INTRODUCTION**

Ahtna Engineering Services, LLC (Ahtna) has developed this report to detail the field activities and findings of a focused groundwater characterization study at the Alaska Real Estate Parking Lot in Anchorage, Alaska. The work was conducted for the Alaska Department of Environmental Conservation (ADEC) under Notice to Proceed Number 18-8036-01-008. This report describes the study objectives, field activities conducted to meet the objectives, and presents the data and findings. This report, along with other historical reports, will be used as a reference for preparation of a groundwater remediation feasibility study for the site.

### **1.1 Background**

The Alaska Real Estate Parking Lot is located at the northeast corner of Fourth Avenue and Gambell Street in Anchorage, Alaska, approximately 1.3 miles east of Cook Inlet's Knik Arm (Figure 1). The approximate location is latitude 61° 13'07.68" north and longitude 149° 52'14.06" west within Section 18, Township 13 North, and Range 3 West of the Seward Meridian.

The lot is undeveloped and used as a gravel-surfaced parking lot with one communication tower/antennae used by Alaska Communication on the southeast corner. The property includes four tax lots (8A, 10, 11, 12) on Block 26A of the East Addition to the Townsite of Anchorage (Figure 2), encompassing approximately 40,600 square feet of land (Ecology and Environment [E&E], 2013). The property is owned by The Fourth and Gambell, LLC organization.

Three structures are known to be previously located on the property: a dry cleaner (C & K Cleaners) in one building on the west side of the property from 1968-1970 and a tire center/automotive shop located in two buildings on the eastern side of the property from 1976-1978 (E&E, 2013). Additionally, a company called New Method Cleaners was located at the lot around 1955 until C&K Cleaners operated there (ADEC, 2014). Contamination found at the parking lot includes volatile organic compounds (VOCs) typically associated with dry cleaning, including tetrachloroethylene (PCE) and one of its breakdown products trichloroethylene (TCE). Three other breakdown products, cis-1,2-dichloroethylene (cDCE), trans-1,2-dichloroethylene (tDCE), and vinyl chloride (VC), have not been detected in the source area but have been detected downgradient.

The property is generally flat at approximately 110 feet above mean sea level. To the north of the parking lot are residential buildings including single- and multi-family dwellings. Further north is the former location of the Alaska Native Hospital. Past the former Alaska Native Hospital is a bluff that steeply drops to an elevation more consistent with Ship Creek and sea level. The area is shown on Figure 2.

Environmental investigations have been conducted at the site beginning in 1993 with an environmental assessment. Additional investigations conducted through 2013 found PCE, and TCE in lower concentrations and with less frequency, in surface and subsurface soil, groundwater, outdoor and indoor air, and soil gas. A summary of site history was provided in the approved work plan (Ahtna, 2014). To date, eleven monitoring wells, six soil borings, and 26 temporary well points have been installed across the site to assess contamination. Two

downgradient contaminated sites, the former Anchorage Terminal Reserve and the Municipal Light and Power facility, have also been investigated for impacts to the environment. One area within in the Anchorage Terminal Reserve site, Groundwater Plume 2/3, is believed to be impacted by the Alaska Real Estate Parking Lot site. Groundwater Plume 2/3 is shown on Figure 3.

This site has also been investigated by the Environmental Protection Agency (EPA). For the EPA program, the site is known as “Fourth and Gambell Parking Lot” and identified by Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) identification number AKN001002925.

## **1.2 Project Objectives**

The two objectives of this project that are reported in this document are the following:

- Assess the status of the PCE plume at the site; and
- Characterize the downgradient portion of the PCE plume north and east of the former Alaska Native Hospital property to aid in delineating the Alaska Real Estate Parking Lot plume from other downgradient plumes.

This report details the tasks performed to meet the objectives.

## 2.0 REGULATORY SETTING

### 2.1 Contaminants of Potential Concern

Sources at the site presumably include sumps connected to wood cribs and buried drums associated with dry cleaning activities, leaky disposal lines, and general housekeeping practices that were common at the time. Based on these sources and the known activities and products used at the site, the primary contaminant of potential concern is PCE. Historical testing at the site has indicated that the breakdown products of PCE, including TCE, DCE isomers, and VC, are present downgradient and may be related to this site.

### 2.2 Cleanup Criteria

A regulatory framework for this project has been developed by consideration of the following regulations and guidance documents.

- 18 Alaska Administrative Code (AAC) 75, Oil and Other Hazardous Substances Pollution Control, April 8, 2012.
- Site Characterization Work Plan and Reporting Guidance for Investigation of Contaminated Sites, DEC Division of Spill Prevention and Response, Contaminated Sites Program, September 23, 2009.
- *Draft Field Sampling Guidance*, DEC Division of Spill Prevention and Response, Contaminated Sites Program, May 2010.
- *Monitoring Well Guidance*, DEC Division of Spill Prevention and Response, Contaminated Sites Program, September 2013.
- *Environmental Molecular Diagnostics*, ITRC web-based guidance document, <http://www.itrcweb.org/emd-2/>.

Groundwater analytical data are compared to groundwater cleanup levels in Table C of 18 AAC 75.345. Table 2-1 lists the cleanup levels for the contaminants of potential concern.

TABLE 2-1: GROUNDWATER CLEANUP LEVELS

Contaminant	Cleanup Level (µg/L)
PCE	5
TCE	5
cDCE	70
tDCE	100
1,1-DCE	7
VC	2

**Key:**

PCE	tetrachloroethylene
TCE	trichloroethylene
1,1-DCE	1,1-dichloroethylene
cDCE	cis-1,2-dichloroethylene
tDCE	trans-1,2-dichloroethylene
VC	vinyl chloride
µg/L	micrograms per liter

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### **3.0 WORK PERFORMED**

This section presents work performed at the Alaska Real Estate Parking Lot site from May 7 to May 22, and August 12, 2014 to accomplish the project objectives. All field and sampling procedures were performed in accordance with the approved work plan dated April 3, 2014 and the approved work plan addendum dated May 6, 2014. The project was managed by Olga Stewart, PE. Alex Geilich, Emily Freitas, and Sam Fox assisted with field work. Permits are included in Appendix A. Field notes, boring logs, and groundwater sampling data sheets are provided in Appendix B. A photograph log is included in Appendix C.

#### **3.1 Utility Locates and Right of Way**

GeoTek Alaska, Inc. (GeoTek), the drilling subcontractor, applied for a Right of Way Permit through the Municipality of Anchorage to drill three monitoring wells in the Right of Way to Ingra Street. The permit was issued on May 2, 2014 and was posted at the site for public notice. The permit is included in Appendix A.

Ahtna and the ADEC Project Manager Grant Lidren visited the Anchorage Ship Creek RV Park located on First Avenue on its opening day of the season, May 1, 2014, to obtain access to the well DPB24 and for drilling a new proposed well. The site manager, John Saari, signed a Limited Right of Entry for Hazardous Substances Investigation on May 2, 2014, which is included in Appendix A.

Ahtna staked the locations of the four proposed monitoring well locations in preparation for utility locates. Ahtna, in coordination with GeoTek, contacted the Alaska Digline on May 2, 2014 for utility locates. Enstar Natural Gas, General Communications, Inc., Alaska Communication Systems, Anchorage Municipal Light and Power (ML&P), and the Anchorage Water and Wastewater Utility all reviewed the proposed locations for utility conflicts and marked nearby underground utilities. GeoTek planner Russell Butler reviewed the utility locations in relation to the proposed monitoring well locations on May 6, 2014 and verified that all locations were at a sufficient distance from all utilities for safe drilling.

Three monitoring wells scheduled for sampling, MW28, MW12S, and MW13, are owned by ML&P. Access to these three wells was coordinated through Yelena Saville, an ML&P Environmental Engineer responsible for groundwater sampling. Wells MW-12S and MW-13 are located within the fenced area of an operating ML&P plant only accessible during working hours on business days. Ms. Saville escorted the field team on the ML&P property during sampling activities of MW-12S and MW13. MW28 is located outside the fenced area and is accessible at any time.

#### **3.2 Soil Boring Drilling and Screening**

GeoTek personnel Glen Rawson and Logan Hermanns began drilling a borehole for the proposed monitoring well 4GMW-15 at the Anchorage Ship Creek RV Park on May 7, 2014. GeoTek used a GeoProbe® Model 8040 DT direct-push drilling rig using DT-45 tooling to produce a 4.5-inch diameter borehole. On May 8, 2014, GeoTek continued drilling boreholes for proposed monitoring wells 4GMW-12, -13, and -14, in that order.

Soil was recovered from each borehole in 5-foot plastic sleeves across the water table to (and below) the Bootlegger Cove formation clay confining layer. General soil types were recorded and Color-Tec screening samples were collected from within 5-foot intervals. No soil samples were collected for laboratory analysis.

Soil was recovered from borehole 4GMW-15 from 5 to 15 feet below ground surface (bgs). Color-Tec screening samples were collected at 6.5, 10, 11, and 14 feet bgs. The Bootlegger clay confining layer was reached at 10.5 feet bgs.

Soil was recovered from borehole 4GMW-12 from 15 to 30 feet bgs. Color-Tec screening samples were collected at 18, 20, 22.5, 24.5, 27, and 30 feet bgs. The Bootlegger clay confining layer was reached at 25.5 feet bgs.

Soil was recovered from borehole 4GWM-13 from 10 to 20 feet bgs. Color-Tec screening samples were collected at 10, 13, 15, 16, and 19 feet bgs. The Bootlegger clay confining layer was reached at 15 feet bgs. Petroleum impacts were noted in all recovered soil based on olfactory and visual screening.

Soil was recovered from borehole 4GWM-14 from 5 to 15 feet bgs. Color-Tec screening samples were collected at 10, 11, 13, and 13.5 feet bgs. The Bootlegger clay confining layer was reached at 13.5 feet bgs. Petroleum impacts were noted in all recovered soil based on olfactory and visual screening. Blebs of fuel were visible on the plastic sleeve.

### **3.3 Monitoring Well Installation**

Upon completion of each borehole, the screened interval was chosen for the monitoring well based on soil types, water level, and Color-Tec screening results. A GeoProbe® 2-inch diameter, 5-foot long, 0.010-inch screen pre-packed with 20/40 silica sand was placed in the borehole at the desired screen interval with additional Schedule 40 polyvinyl chloride (PVC) casing attached as riser to the ground surface. Colorado 10/20 silica sand was poured into the borehole annulus to provide additional packing around and above the screen. Bentonite chips hydrated in place were used as a seal above the sand pack. All four wells were completed with 8-inch diameter steel monuments mounted flush with the ground surface and encased in concrete. Details for each well are provided below and also in the boring logs attached in Appendix B.

Monitoring well 4GMW-12 was placed at a total depth of 29 feet bgs, with the screened interval placed from 24 to 29 feet bgs. The sand pack was placed from 22 to 29 feet bgs and the bentonite seal from 4.5 to 22 feet bgs. Additional sand was placed from the flush monument to 4.5 feet bgs.

Monitoring well 4GMW-13 was placed at a total depth of 13.5 feet bgs, with the screened interval placed from 8.5 to 13.5 feet bgs. The sand pack was placed from 6 to 13.5 feet bgs and the bentonite seal from 2 to 6 feet bgs. Additional sand was placed from the flush monument to 2 feet bgs.

Monitoring well 4GMW-14 was placed at a total depth of 13.5 feet bgs, with the screened interval placed from 8.5 to 13.5 feet bgs. The sand pack was placed from 5.5 to 13.5 feet bgs and

the bentonite seal from 2 to 5.5 feet bgs. Native material was placed from the flush monument to 2 feet bgs.

Monitoring well 4GMW-15 was placed at a total depth of 9.5 feet bgs, with the screened interval placed from 4.5 to 9.5 feet bgs. The sand pack was placed from 2 to 9.5 feet bgs and the bentonite seal from 0.8 to 2 feet bgs.

### **3.4 Monitoring Well Development**

The bentonite and concrete seals in the new monitoring wells were allowed to cure for 4 days and then the wells were developed by Alex Geilich on May 13, 2014. Each well was developed by surging and purging with a submersible ProActive™ pump. Purge water was containerized in 5-gallon buckets, and then transferred into staged 55-gallon drums for transport and disposal.

Monitoring well 4GMW-12 had 9.82 feet of water at the time of development. A total of 23 gallons, or 13.5 well volumes, of water were purged when the water became substantially sediment free.

Monitoring well 4GMW-13 had 4.18 feet of water at the time of development. A total of 8 gallons, or 11.2 well volumes, of water were purged. The water did not clear and remained a dark color with a strong fuel odor, small droplets of fuel, and sheen present.

Monitoring well 4GMW-14 had 5.93 feet of water at the time of development. A total of 13 gallons, or 10.5 well volumes, of water were purged. The water did not clear and remained a dark color with a strong fuel odor, small droplets of fuel, and sheen present.

Monitoring well 4GMW-15 had 3.86 feet of water at the time of development. Approximately 10 well volumes, or 8 gallons, of water were purged. The water was cloudy and had a fuel odor.

### **3.5 Monitoring Well Decommissioning**

Four wells were decommissioned in place as part of this project. Monitoring wells MW-1/EPM-1, MW-2, MW-3, and MW-4, which were placed in 1997 (MW-1/EPM-1) and 2005 (MW-2, -3, -4) in the source area of the Alaska Real Estate Parking Lot, were decommissioned on May 7, 2014. Years of freeze/thaw cycles, vehicle traffic, and plowing of snow on the lot caused damage to the wells that compromised their integrity for use. All four wells were located using a metal detector and historical site map. The flush monuments were located approximately 3 to 6 inches below the gravel surface, and the PVC well risers were approximately 1 foot bgs.

At MW-1/EPM-1, the lid of the flush monument was missing, the PVC well cap was missing, and both the monument and PVC were filled with dirt, bentonite, and debris to the surface. The flush monument and concrete apron were removed, disposed, and the area was backfilled with pea gravel and native material flush with the parking lot surface.

At MW-2, the lid of the flush monument was missing, but the PVC well cap was in place. The monument annulus was filled with dirt and bentonite. Only 15 feet of the original 45 feet of depth was clear; the bottom 30 feet of the well, including the screened interval, was filled and the bottom of the well was not able to be removed. The remaining 15 feet was filled with bentonite

chips hydrated in place. The flush monument and cold patch apron were removed, disposed, and the area was backfilled with pea gravel and native material flush with the parking lot surface.

At MW-3, the lid of the flush monument was intact, but the sidewalls had been crushed inward. The PVC well cap was present but was loosely placed atop of the PVC. Only 7 feet of the original 45 feet of depth was clear; the bottom 38 feet of the well, including the screened interval, was filled and the bottom of the well was not able to be removed. The remaining 7 feet was filled with bentonite chips hydrated in place. The flush monument was removed, disposed, and the area was backfilled with pea gravel and native material flush with the parking lot surface.

At MW-4, the lid of the flush monument was intact, but the PVC well cap was missing. Only 30 feet of the original 50 feet was clear; the bottom 20 feet of the well, including the screened interval, was filled and the bottom of the well was not able to be removed. The remaining 30 feet was filled with bentonite chips hydrated in place. The flush monument and cold patch apron were removed, disposed, and the area was backfilled with pea gravel and native material flush with the parking lot surface.

Photographs of the monitoring well decommissioning are included in Appendix C.

### **3.6 Groundwater Sampling**

Thirteen groundwater monitoring wells were sampled from May 13, 2014 until May 15, 2014 for assessment of contaminants, bacteria, attenuation parameters, and isotope analysis. All wells were sampled using a submersible bladder pump with Teflon bladder, with the exception of well DPB24. Well DPB24 was only 1-inch diameter and unable to accommodate the bladder pump so the well was sampled using a peristaltic pump with Teflon-lined tubing. All wells were sampled using low-flow sampling procedures using a Yellow Springs Instruments (YSI) model 556 water quality meter to record groundwater quality parameters. An Oakton T-100 turbidimeter was also used to record turbidity measurements during purging.

Low-flow procedures were used for sampling at all wells. The drawdown and at least three of the five water quality parameters on all wells stabilized during purging. No wells were purged dry. The samples collected are listed in Table 3-1. Groundwater sampling logs are provided in Appendix B.



TABLE 3-1: GROUNDWATER SAMPLES

Well ID	VOCs	MNA	CSIA	Dhc	vcrA
MW-5	X	X	X	X	
MW-6	X	X	X	X	
MW-7	X				
MW-8	X				
MW-10	X	X			
4GMW-12	X				
4GMW-13	X				
4GMW-14	X				
4GMW-15	X	X	X		
MW12S (ML&P)	X				
MW-13 (ML&P)	X				
MW-28 (ML&P)	X	X	X	X	X
DPB24 (ARRC)	X				

**Key:**

VOCs volatile organic compounds  
MNA monitored natural attenuation  
CSIA compound specific isotope analysis  
Dhc dehalococoides

MW monitoring well  
ML&P Municipal Light and Power  
ARRC Alaska Railroad Corporation  
vcrA vinyl chloride reductase

### 3.7 Continuous Water Level Readings

Once sampling was complete at monitoring wells DPB24, MW12S, and 4GMW-13, Solinst® data logging pressure transducers (dataloggers) were placed in the wells. The dataloggers were deployed on steel wire with swivels to prevent erroneous measurements from cable stretch or twisting. The dataloggers were set to record pressure every hour on the hour. One barometric pressure datalogger (barologger) was placed at the site in well 4GMW-14. This location deviated from the work plan because of restricted access to well MW-12S at ML&P. Details of the datalogger placements are shown in Table 3-2. Data were collected by the dataloggers from May 16 until August 12, 2014.

During review of field notes in July, it was determined that the barologger had been mistakenly deployed below the water table. This was corrected on July 15, 2014, when the steel cable was shortened for the barologger to collect air pressure data at well 4GMW-14. Due to the lack of barometric pressure data from May until July, the dataloggers will remain in place until spring 2015 to continue collecting groundwater level data for comparison to Ship Creek surface water levels.

TABLE 3-2: DATALOGGER PLACEMENTS

Well ID	Datalogger ID	Deploy Depth (ft btoc)	Water Depth (ft btoc)	Total Depth of Well (ft btoc)
4GMW-14	0042030206	12.84	5.84	13.22
4GMW-14	0012030250	2.0	5.84	13.22
MW12S (ML&P)	0022029069	8.06	6.45	9.35
DPB24 (ARRC)	0042016879	11.37	6.57	11.82

**Key:**

ARRC Alaska Railroad Corporation  
ML&P Municipal Light and Power

ft btoc feet below top of casing

### **3.8 Surveying**

Horizontal locations of each monitoring well that was sampled or decommissioned were collected using a handheld Trimble GeoXH 6000 GPS unit. The data was post-processed using Trimble Pathfinder Office software. The base station used for differential correction was TBON, a Department of Transportation Continuously Operating Reference Station (CORS) located in Anchorage.

Vertical locations (elevations) of the four new wells and the two additional wells used for datalogger placement were surveyed by Dylan Hickey, an Ahtna staff surveyor. The survey was referenced to a bench mark located in the north face of a building foundation northeast of the intersection at Sixth and Cordova streets in Anchorage (permanent identifier TT0728).

The elevation of surface water at Ship Creek was also surveyed at a location close to the site to provide comparison to the United States Geologic Survey (USGS) gauge 15276000 located approximately 11 river miles upstream. The measurement location at Ship Creek is shown on Figure 3 and the gauge location is shown on Figure 1.

### **3.9 Waste Management**

Minimal soil cuttings were created during direct-push drilling for boring and well placement. All soil retrieved for screening was placed in one 55-gallon drum labeled non-hazardous waste. The drum lid was secured and the drum staged at the corner of First Avenue and Ingraham Street in Anchorage during drilling. Once all soil was placed in the drum, a soil sample from the drum was collected for analysis of VOCs by EPA Method 8260. The sample was named 14-AKRE-Cuttings and a trip blank was included with the sample. The drum was then loaded into the field vehicle, and moved to the Alaska Real Estate Parking Lot where it was staged with the purge water from groundwater monitoring in a locked chain-linked fence until pickup.

Soil cutting results were reported by TestAmerica on May 21, 2014. No analytes were detected at concentrations greater than hazardous waste levels. Emerald Alaska, Inc. prepared a Non-Hazardous Waste Manifest for transport to and disposal of the soil at their facility in Anchorage, Alaska. A copy of the manifest is included in Appendix D.

Well monuments and aprons generated during well decommissioning were collected by GeoTek and disposed as general debris at the Anchorage Regional Landfill in Eagle River, Alaska. No well piping or screens were removed; no well decommissioning materials were determined to be listed waste requiring disposal as hazardous waste.

All development and purge water was collected in 5-gallon buckets and transferred to two 55-gallon drums located at a staging area at the Alaska Real Estate Parking Lot site. The drums were labeled hazardous waste with the drum lid secured. The staging area was surrounded by locked chain-linked fencing until pickup.

All disposable sampling materials that came in contact with development and purge water, including paper towels, nitrile gloves, and sample tubing, as well as spent Color-Tec tubes from soil screening during drilling, were placed in one 55-gallon drum located in the secured waste

staging area at the Alaska Real Estate Parking Lot site. The drum was labeled hazardous waste with the drum lid secured.

Ahtna coordinated with the EPA to determine the correct site identification for hazardous waste disposal. Per Ted Enderle of EPA Region 10, EPA Resource Conservation and Recovery Act (RCRA) identification number AKR000201574 was used for manifesting and disposal. Emerald Alaska, Inc. prepared a Uniform Hazardous Waste Manifest for the two purge water drums and one solid waste drum for disposal as F002 listed hazardous waste. The ADEC was listed as the generator of waste and US Ecology Idaho, Inc. as the final disposal facility.

In preparation for transportation of waste, an ADEC contaminated soil transport and treatment approval form was obtained (Appendix D). Emerald Alaska, Inc. picked up, transported, and disposed of the one drum of non-hazardous soil at their facility in Anchorage, Alaska on May 22, 2014. Emerald Alaska, Inc. picked up, transported, and transferred the three drums of F002 hazardous waste on May 22, 2014. US Ecology Idaho, Inc. received the waste on June 18, 2014. Copies of the completed manifests are included in Appendix D.

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## **4.0 RESULTS AND FINDINGS**

The following sections document the results and findings of work completed at the Alaska Real Estate Parking Lot site from May 7 to May 22, and August 12, 2014 to accomplish the project objectives.

### **4.1 Survey Results**

Horizontal locations of the four new monitoring wells, the four decommissioned wells, and the nine other wells sampled at the site are included in Table 1. Results are reported in northings and eastings, in US survey feet, in the North American Datum of 1983 (NAD83), epoch 2011, and coordinate system Alaska State Plane Zone 4.

The vertical locations of the four new monitoring wells and the two additional wells used for datalogger placement are included in Table 1. The results are reported in the North American Vertical Datum of 1988 (NAVD88) in feet.

To prepare accurate figures for the site, historic survey reports were used to place locations of additional site features and historic sampling locations. GPS data reported in latitude and longitude by E&E in 2013 was used to locate the points BH01GW through BH12GW. Survey data reported by Mammoth Consulting for OASIS in 2011 was used to locate the point MW-11 and confirm the horizontal data for points MW-5 through MW-11. Survey data reported by Karabelnikoff Surveying for CH2M Hill in 2008 was used to locate the points WP1 through WP15, and confirm locations of MW-1 through MW-9, MW12S, MW24S, and MW28. The compiled data for the points used are also included in Table 1.

### **4.2 Soil Screening Results**

Results of the soil screened for total VOCs using the Color-Tec method are shown in Table 2. Soil analyzed from boreholes 4GMW-13, 4GMW-14, and 4GMW-15 had one detection each of low-level VOCs. Additionally, the field team noted a strong hydrocarbon odor and visual evidence of hydrocarbon staining of soil at boreholes 4GMW-13, 4GMW-14, and 4GMW-15. No soil samples were collected to verify results.

### **4.3 Groundwater Monitoring Results**

Groundwater monitoring results are shown in Table 3. They were used to indicate stability during sampling and to indicate water quality and chemistry conditions for use in determining whether the groundwater is within the same network. The groundwater monitoring parameters measured were temperature, pH, conductivity, oxidation-reduction potential (ORP), dissolved oxygen (DO), and turbidity.

Results for pH were fairly consistent throughout all samples, ranging from 6.08 to 7.18, all within the neutral pH range that supports microbes. Temperature was highest in the wells in the source area at around 8 degrees Celsius (°C) and lowest in the wells nearest Ship Creek at around 4°C. Conductivity at 11 of the 13 wells was fairly consistent, ranging from 0.3 to 0.8 microSiemens per centimeter (µS/cm), all within one standard deviation. The background well

had a reading of 0.995  $\mu\text{S}/\text{cm}$  and well MW-12S had a reading of 0.208  $\mu\text{S}/\text{cm}$ . Both are within two standard deviations and can likely be considered from the same groundwater network.

DO and ORP measurements are used to assess whether conditions are favorable for contaminant degradation via biodegradation and reported with the monitored natural attenuation (MNA) results (Section 4.5.2).

#### **4.4 Groundwater Level Reading Results**

Dataloggers were deployed at the site in three downgradient wells from May 16 until August 12, 2014 to continuously read water levels in the wells relative to each other (Figure 3). The dataloggers will remain deployed until spring 2015 to continue reading water level and barometric pressure to allow comparison to surface water levels at Ship Creek. Raw datalogger data is included in Appendix F.

Groundwater levels were plotted versus time for the three wells. Data are shown in Chart 1. Note that the data are not corrected for barometric pressure prior to July 18, 2014 and should only be used as relative to each other. Six times were chosen for evaluation of groundwater flow direction, listed below and shown on Chart 1. These times were chosen at the relative peaks and troughs of groundwater levels to assess the extent of variation in flow direction over the period of data collection.

- 05/27/2014 02:00 – relative low for DPB24
- 06/08/2014 10:00 – relative low for all three wells
- 06/14/2014 12:00 – relative high for DPB24
- 07/06/2014 19:00 – relative low for DPB24
- 07/29/2014 10:00 – relative high for all three wells
- 08/04/2014 17:00 – relative low for all three wells

Groundwater flow direction at all six times was consistently west, with small variation to the southwest, as shown on Figure 3.

#### **4.5 Groundwater Sample Results**

Sample results are shown in Tables 4 through 7, appended to this report, and described in the following sections.

##### **4.5.1 Contaminants of Potential Concern**

The contaminants of potential concern (COPCs) that were analyzed were PCE, TCE, cDCE, tDCE, 1,1-DCE, and VC. These results are used to determine whether the chemicals are present at concentrations that are greater than the cleanup levels and to evaluate degradation based on the presence of daughter products. Because the source is PCE, the presence of TCE, DCE, and VC may indicate that degradation is occurring through reductive dechlorination.

PCE was detected at concentrations greater than the cleanup level in the three wells in the source area (MW-5, MW-6, MW-7), and one well downgradient (MW-28). PCE was detected at

concentrations less than the cleanup level in well MW-8, believed to be along the east edge of the plume. Downgradient wells DPB24 and 4GMW15 did not have PCE detected and bound the plume to the west. The two new eastern-most wells, 4GMW-12 and 4GMW-13, had no detections and now bound the plume to the east.

TCE was detected at concentrations greater than the cleanup level only in MW-28. TCE was not detected in source wells MW-5 and MW-6, but the practical quantitation limit (PQL) and method detection limit (MDL) were greater than the cleanup level. Based on these and historical data, it is unlikely that TCE is present in the source area at concentrations greater than the cleanup level.

The compound cDCE was detected at concentrations greater than the cleanup level in wells MW-28 and 4GMW-14, both located downgradient. cDCE was also detected in three other downgradient wells, 4GMW-15, MW-12S, and MW-13, but at concentrations less than the cleanup level. cDCE was not detected in the source area.

The compound tDCE was only detected at concentrations less than the cleanup level. Detections were found in downgradient wells 4GMW-14, 4GMW-15, and MW-28. tDCE was not detected in the source area.

The compound 1,1-DCE was not detected in any well and the PQL and MDL were all less than the applicable cleanup level.

Vinyl chloride was detected at concentrations greater than the cleanup level in downgradient wells 4GMW-14, 4GMW-15, and MW-28. At all other wells vinyl chloride was not detected.

These data are shown in Table 4, along with the most current data available for each location represented on Figure 3. There are not sufficient historic data points to analyze results over time; the data are not used to determine trends. However, these data indicate that degradation is not occurring within the source area as PCE remains at concentrations consistent with the previous results from 2007 and 2008 and none of the degradation products of PCE were detected.

However, the results indicate that degradation likely is occurring downgradient at well MW-28, as TCE, DCE, and VC were detected in the well. These results are also consistent with previous sample results from MW-28.

#### **4.5.2 Monitored Natural Attenuation Parameters**

The MNA parameters that were analyzed by a laboratory were iron, nitrate and nitrite, sulfate, total organic carbon, methane, ethane, and ethene. The MNA parameters that were analyzed with a water quality meter during field sampling were DO and ORP. For the degradation of PCE into daughter products via reductive dechlorination, typically the conditions need to be strongly anaerobic. In an anaerobic environment, iron, methane, ethane, and ethene concentrations typically are higher than the background levels, and nitrate/nitrite, sulfate, DO, and ORP typically are lower than the background levels. Total organic carbon gives an indication of how much organic material may be available for degradation and ideally should be elevated to support continual biodegradation. Monitoring well MW-10 was used as the background well for comparison purposes. DO and ORP results are shown in Table 3. Laboratory results are shown in Table 5.

Background DO was 11.17 milligrams per liter (mg/L), which is nearly the maximum solubility of oxygen in water at 9°C. All monitoring wells showed lower DO than the background concentration. Five downgradient wells had DO concentrations less than 0.5 mg/L, indicating that anaerobic conditions exist and the reductive pathway would be supported. DO in the source area was around 3 mg/L, which indicates that reduction likely would not occur.

Results show that ORP is negative in the downgradient areas, particularly in areas that showed evidence of petroleum contamination. The negative results ranged from -44.7 to -9.3 millivolts (mV), which suggests that the reductive pathway is active. ORP in the source area ranged from 67 to 221 mV, indicating an oxidative environment with minimal existing reducing conditions.

Comparison of the concentrations of MNA parameters of the two source area wells (MW-5 and MW-6) to the background well show that biodegradation of PCE in the source area does not appear to be occurring in any appreciable manner. Iron, methane, ethane, and ethene are all lower than background, and nitrate/nitrite and sulfate are higher than background. Total organic carbon is at a concentration that likely cannot support continual biodegradation.

Comparison of the MNA parameters in the two downgradient wells (MW-28 and 4GMW-15) to the background wells show that degradation conditions are present in the lower portion of the plume. At MW-28, iron, methane, ethane, and ethene are all higher than background by at least one order of magnitude. Nitrite/nitrate and sulfate are all non-detect at concentrations at least one order of magnitude lower than the background concentration.

### **4.5.3 Microbial Analysis**

Two types of microbial analysis were sampled for in groundwater at the site: the presence of *Dehalococcoides* (Dhc) bacteria and the vinyl chloride reductase (*vcrA*) gene. Dhc are the only known organisms capable of completely dechlorinating chloroethenes (i.e., PCE and its daughter products) to ethane. Negative results for Dhc indicate that dechlorination will be incomplete. Positive results indicate that complete dechlorination may be possible. *vcrA* is the gene in Dhc that is the most common enzyme used to convert VC to ethene to complete the dechlorination process.

Three samples were submitted for analysis of Dhc – two from source area wells and one from downgradient well MW-28. Results are shown in Table 6. Dhc was not found at detectable concentrations in either source well MW-5 or MW-6, indicating that dechlorination is not likely occurring in the source area. Dhc was found in MW-28 at a population of  $1 \times 10^6$  per liter, indicating that enough Dhc is present to completely dechlorinate PCE to ethene. Groundwater from MW-28 was also analyzed for *vcrA*, which was found at a concentration  $4 \times 10^5$  per liter. Since the concentration of *vcrA* is similar (within 3-fold) to the concentration of Dhc, this indicates that the entire Dhc population likely has the *vcrA* gene and that complete reductive dechlorination of PCE to ethene is highly possible. Ethene was detected in the groundwater at MW-28 so it is unlikely that dechlorination would stall at VC.



#### **4.5.4 Compound Specific Isotope Analysis**

Groundwater samples from two source area wells (MW-5 and MW-6) and two Ship Creek area wells (MW-28 and 4GMW-15) were submitted to Pace Analytical for compound specific isotope analysis (CSIA) of carbon and chlorine. Isotopic signatures can be compared at various locations through a contaminant plume as another line of evidence that degradation is occurring, or to compare source signatures. Degradation processes preferentially degrade “lighter” isotopes, leading to an increase in “heavier” isotopes in the parent compound. Isotopic signatures of parent compounds, such as PCE, become less negative (“heavier”) as degradation proceeds due to this preferential removal of isotopically light molecules.

The relative abundance of the two stable isotopes of carbon ( $^{13}\text{C}$  and  $^{12}\text{C}$ ) and chlorine ( $^{37}\text{Cl}$  and  $^{35}\text{Cl}$ ) in PCE were measured. Since concentrations of daughter products were not found in the source area to offer a comparison, the analysis was not conducted on TCE, DCE, or VC. The relative abundance ratios were expressed relative to the international standards of  $^{13}\text{C}$  and  $^{12}\text{C}$  in Pee Dee Belemnite (PDB) and  $^{37}\text{Cl}$  and  $^{35}\text{Cl}$  in Standard Mean Ocean Chlorine (SMOC). Measured values were reported as  $\delta^{13}\text{C}$  and  $\delta^{37}\text{Cl}$ , respectively, in units of parts per thousand (‰). The terms are defined as follows:

$$\delta^{13}\text{C} (\text{‰}) = \left[ \frac{(^{13}\text{C}/^{12}\text{C})_{\text{sample}} - (^{13}\text{C}/^{12}\text{C})_{\text{standard}}}{(^{13}\text{C}/^{12}\text{C})_{\text{standard}}} \right] \times 1000 \text{ and}$$
$$\delta^{37}\text{Cl} (\text{‰}) = \left[ \frac{(^{37}\text{Cl}/^{35}\text{Cl})_{\text{sample}} - (^{37}\text{Cl}/^{35}\text{Cl})_{\text{standard}}}{(^{37}\text{Cl}/^{35}\text{Cl})_{\text{standard}}} \right] \times 1000 \text{ (USEPA, 2008).}$$

Results for MW-5, MW-6, and MW-28 are considered accurate to the  $\pm 0.5\text{‰}$  standard for CSIA. The PCE concentration in 4GMW-15 was low, therefore the carbon isotopic signature is considered usable to  $\pm 2\text{‰}$  and the chlorine isotopic signature was not obtained. Results are shown in Table 7.

In the known source area, carbon isotopic signatures at MW-5 and MW-6 were  $-34.07\text{‰}$  and  $-33.79\text{‰}$ , respectively. Chlorine isotopic signatures at these monitoring wells were  $0.4\text{‰}$  and  $0.31\text{‰}$ , respectively. Generally, when the isotopic signatures of carbon are within  $0.5\text{‰}$  of one another, as they are for MW-5 and MW-6, the samples can be considered to represent the same source material, likely with little or no biodegradation occurring along the flow-path between the two wells.

MW-28 in the Ship Creek area had a carbon isotopic signature of  $-36.34\text{‰}$  and a chlorine isotopic signature of  $-1.21\text{‰}$ , both of which are significantly lighter than the corresponding isotopes at MW-5 and MW-6. Therefore the data suggests either a different source, or that the PCE at MW-5 and MW-6 has undergone more degradation than the PCE observed at MW-28.

Carbon and chlorine isotopic signatures in PCE at various plume locations may be plotted versus one another for two dimensional analysis. Carbon and chlorine isotopic signatures may have a linear relationship (straight line on a bivariate plot) if results arise from the same source, and degradation proceeds at similar rates throughout a monitoring well network. Deviations from the linear relationship are caused by different sources or changes in degradation mechanisms and rates. Chart 2 shows a two dimensional analysis of  $\delta^{13}\text{C}$  and  $\delta^{37}\text{Cl}$  in PCE for MW-5, MW-6, and

MW-28. The error bars correspond to  $\pm 0.5\%$ . Data from 4GMW-15 was omitted because it has an error of  $\pm 2\%$  for carbon, and the chlorine  $\delta^{37}\text{Cl}$  was not reported due to a low PCE concentration. Data points for MW-5 and MW-6 lie relatively close to one another in comparison to MW-28. However, more data points are needed to for a conclusive two dimensional analysis and to determine if MW-28 is an outlier, or represents a second source.

CSIA results are best utilized when evaluated with geochemical parameters and information on degradation mechanisms. Geochemical conditions at MW-28 and 4GMW-15 in the Ship Creek area are more conducive to reductive dechlorination than MW-5 and MW-6 in the source area. The difference in geochemical conditions is summarized in Table 4-1.

**TABLE 4-1: SUMMARY OF GEOCHEMICAL CONDITIONS**

Parameter	MW-28 and 4GMW-15 Average	Comparison	MW-5 and MW-6 Average
Dissolved Oxygen	0.67 mg/L	<	3.07 mg/L
Oxidation-Reduction Potential	-14.8 mV	<	113.45 mV
Nitrates	0.11 mg/L	<	5.2 mg/L
Total Organic Carbon	3.1 mg/L	>	1.7 mg/L
Methane	780 ug/L	>	0.13 ug/L
Ethane	0.205 ug/L	>	0.016 ug/L
Ethene	5.6 ug/L	>	0.014 ug/L
Microbes	1 x 10 <sup>6</sup> Dhc	>	ND

**Key:**

Dhc     Dehalococcoides  
mg/L    milligrams per liter  
mV     millivolts  
ug/L    micrograms per liter  
ND      non-detect

In summary, CSIA results show PCE with heavier isotopic signatures at MW-5 and MW-6 in the source area than at MW-28 in the Ship Creek area. In other words, if both areas of contamination were caused by the same source, PCE remaining at MW-5 and MW-6 is more degraded than PCE remaining at MW-28. However, geochemical parameters and microbial population analyses show that conditions at MW-28 are more conducive to reductive dechlorination. Therefore it is expected that PCE at MW-28 would be more degraded than PCE at MW-5 and MW-6 if both were caused by the same source.

It appears more probable that two sources exist, given the combination of CSIA, geochemical, and Dhc data. In order for PCE at MW-5 and MW-6 to be from the same source as MW-28, it would have had to undergo degradation to result in a heavier  $\delta^{13}\text{C}$ -PCE, but yet there are no daughter products detected there; the geochemistry is shown to be unfavorable for degradation; and Dhc were not detected there. A more likely explanation is that the MW-28 PCE represents a different source, or combination of sources, than MW-5 and MW-6.

## **5.0 QUALITY ASSURANCE AND QUALITY CONTROL**

The following sections details the quality assurance and quality control measures taken during the completion of this project to ensure that the quality objectives were met.

### **5.1 Personnel**

Fieldwork, including analytical sampling, was performed by Olga Stewart, Emily Freitas, Alex Geilich, and Sam Fox, all who meet the definition of “qualified person” per 18 AAC 75.990(100).

### **5.2 Decontamination**

Equipment used for this project that required decontamination included a water level meter, bladder pump, flow-through cell, and submersible semi-disposable pump used for well development. The pumps were decontaminated in a three step process including washing and pumping through the anionic detergent Alconox, rinsing and pumping through with tap water, and then rinsing and pumping through with deionized water. The flow-through cell and water level meter were washed with Alconox and rinsed with deionized water.

### **5.3 Sample Collection**

Groundwater samples were collected directly into laboratory-provided, individual, dedicated containers from the sample pump. Samples collected for volatile analyses were collected first, followed by the other analytes. Samples were preserved in the field as specified in the work plan; the iron samples and Dhc samples were filtered in the field.

### **5.4 Sample Handling**

Following collection, samples were placed in coolers with sufficient gel ice to maintain temperatures for sample preservation. At the end of each day, samples were transferred to a refrigerator at the Ahtna office for storage until shipment to the laboratory for analysis. Samples were tracked by use of chain of custody forms with each sample and the trip blank individually identified on the forms. The forms were signed and dated when the samples were packaged for shipment to the respective laboratories, and signed and dated when received by the laboratories.

### **5.5 Equipment Calibration**

Equipment used for this project that required calibration included a water quality meter, and a turbidimeter. Each were calibrated each day prior to sampling. The calibrated reading was compared to the standard and the relative percent difference (RPD) calculated. Calibration results were within the following tolerances:

- Conductivity  $\pm 1.5\%$
- DO  $\pm 5\%$
- pH  $\pm 0.05$
- ORP  $\pm 5$  mV

## **5.6 Analytical Data**

The analytical data were reviewed for quality including completeness, correctness, and compliance with method procedures and quality control requirements. The precision, accuracy, representativeness, comparability, completeness, and sensitivity were evaluated as required by ADEC guidelines. An ADEC Laboratory Data Review Checklist is included for the five sample delivery groups (SDG) in Appendix E.

Based on the review, all sample results are considered valid with no data rejected. One “J” qualifier was assigned to the gasoline-range organics (GRO) result for sample 14-AKRE-Cuttings because surrogate recovery was outside acceptable limits. “J” qualifiers were assigned to data reported for ethane and ethene greater than the MDL but less than the PQL. Details of the analytical review are summarized in the following sections.

### **5.6.1 Field Sample Plan**

Table 5-1 lists the field sample numbers, corresponding laboratory and laboratory numbers, requested analyses, and identifies quality control (QC) samples.

**TABLE 5-1: FIELD SAMPLE PLAN OVERVIEW**

<b>Field Sample ID</b>	<b>Laboratory</b>	<b>Lab Sample ID</b>	<b>Analyses Requested</b>	<b>QC</b>	<b>SDG</b>
14-AREPL-MW5-GW	SiREM	DHC-10436	Gene-Trac Dhc		S-3215
	Pace	P1405002-01A	CSIA – Carbon CSIA-Chlorine		P1405002
	OnSite	05-144-03	VOCs, TOC, Nitrate/Nitrite, Sulfate, Total Iron, Dissolved Iron, Methane, Ethane, Ethene		1405-144
14-AREPL-MW6-GW	SiREM	DHC-10437	Gene-Trac Dhc		S-3215
	Pace	P1405002-03A	CSIA – Carbon CSIA-Chlorine		P1405002
	OnSite	05-144-04	VOCs, TOC, Nitrate/Nitrite, Sulfate, Total Iron, Dissolved Iron, Methane, Ethane, Ethene		1405-144
14-AREPL-MW60-GW	OnSite	05-144-15	VOCs	Duplicate of 14-AREPL- MW6-GW	1405-144
14-AREPL-MW7-GW	OnSite	05-144-02	VOCs		1405-144
14-AREPL-MW8-GW	OnSite	05-144-09	VOCs		1405-144
14-AREPL-MW80-GW	OnSite	05-144-14	VOCs	Duplicate of 14-AREPL- MW8-GW	1405-144

Field Sample ID	Laboratory	Lab Sample ID	Analyses Requested	QC	SDG
14-AREPL-MW10-GW	OnSite	05-144-01	VOCs, TOC, Nitrate/Nitrite, Sulfate, Total Iron, Dissolved Iron, Methane, Ethane, Ethene		1405-144
14-AREPL-4GMW-12-GW	OnSite	05-144-10	VOCs		1405-144
14-AREPL-4GMW-13-GW	OnSite	05-144-11	VOCs		1405-144
14-AREPL-4GMW-14-GW	OnSite	05-144-12	VOCs		1405-144
14-AREPL-4GMW-15-GW	Pace	P1405002-04A	CSIA – Carbon CSIA-Chlorine		P1405002
	OnSite	05-144-12	VOCs, TOC, Nitrate/Nitrite, Sulfate, Total Iron, Dissolved Iron, Methane, Ethane, Ethene		1405-144
14-AREPL-MW12S-GW	OnSite	05-144-06	VOCs		1405-144
14-AREPL-MW-13-GW	OnSite	05-144-07	VOCs		1405-144
14-AREPL-MW-28-GW	SiREM	DHC-10438 VCR-4886	Gene-Trac Dhc, Gene-Trac VC		S-3215
	Pace	P1405002-02A	CSIA – Carbon CSIA-Chlorine		P1405002
	OnSite	05-144-05	VOCs, TOC, Nitrate/Nitrite, Sulfate, Total Iron, Dissolved Iron, Methane, Ethane, Ethene		1405-144
14-AREPL-DPB24-GW	OnSite	05-144-08	VOCs		1405-144
14-AREPL-TB	OnSite	05-144-16	VOCs	Trip Blank	1405-144
14-AKRE-Cuttings	TestAmerica	230-108-1	GRO, DRO, VOCs		230-108
14-AKRE-TB	TestAmerica	230-108-2	GRO, VOCs	Trip Blank	230-108

**Key:**

AREPL Alaska Real Estate Parking Lot  
CSIA carbon stable isotope analysis  
Dhc dehalococcoides  
DRO diesel-range organics  
GRO gasoline-range organics  
QC quality control  
SDG sample delivery group  
TOC total organic carbon  
VOCs volatile organic compounds  
VC vinyl chloride

## 5.6.2 Sample Receipt Condition

Samples were divided into four groups for laboratory delivery. Holding time criteria were met for all laboratories and analyses.

Water samples were shipped to OnSite Environmental in Redmond, Washington on May 16, 2014 via Alaska Air Cargo Goldstreak. Fifteen samples and a trip blank were received in one SDG on May 17, 2014, properly preserved and within the acceptable temperature range of 2°C to 6°C. All samples were received in good condition. Five samples were shipped to Pace Analytical (formerly Microseeps) in Pittsburgh, Pennsylvania on May 20, 2014 for analysis of methane, ethane, and ethene. The samples were received at 2°C in good condition and properly preserved on May 21, 2014. OnSite analyzed samples for total organic carbon, Nitrate/Nitrite, Sulfate, Total Iron, dissolved iron, PCE, TCE, cDCE, tDCE, 1,1-DCE, and VC. All results were reported under work order number 1405-144. Onsite and Pace are ADEC-certified laboratories for the analyses performed.

Samples were shipped to Pace Analytical (formerly known as Microseeps) in Pittsburgh, Pennsylvania on May 16, 2014 via FedEx. Four samples were received in one SDG on May 19, 2014, properly preserved, at 5°C, and in good condition. Five vials had a sample name that did not match the Chain of Custody. The Ahtna project manager was contacted for clarification. Pace Analytical analyzed the samples for CSIA-Carbon and CSIA-Chlorine and reported the results under work order number P1405002. ADEC does not certify laboratories for CSIA analysis.

Samples were shipped to SiREM in Guelph, Ontario, Canada on May 19, 2014 via FedEx. Three samples were received in one SDG on May 20, 2014 at 2°C, properly preserved, and in good condition. SiREM analyzed the samples for GeneTrac-Dhc and reported the results under work order number S-3215. Upon receipt of result, Ahtna requested additional analysis for vcrA of one sample via email that is not included on the Chain of Custody. Additional results were also reported under S-3215. ADEC does not certify laboratories for Dhc or vcrA analysis.

Samples were hand delivered to TestAmerica in Anchorage on May 9, 2014 immediately after sample collection. One sample and a trip blank were received in one SDG, properly preserved, in good condition, and at a temperature of 15.8°C, outside of the acceptable temperature range. Chilling of the sample commenced after submittal to the laboratory. TestAmerica-Anchorage analyzed samples for DRO and GRO. TestAmerica-Spokane was subcontracted to analyze samples for VOCs. One sample and a trip blank were shipped to TestAmerica-Spokane on May 12, 2014. Samples were received on May 13, 2014 properly preserved, in good condition, and at 5.6 °C. TestAmerica-Anchorage and TestAmerica-Spokane are ADEC-certified laboratories for the analyses performed.

### **5.6.3 Precision**

Precision of analytical data was assessed by calculating the RPD between the primary and duplicate of field samples and laboratory control samples (LCS) and laboratory control sample duplicates (LCSD). Per the approved work plan, field duplicates were only provided for VOC analysis, not the MNA parameters, CSIA, bacteria analysis, or waste characterization.

Sample 14-AREPL-MW60-GW was collected as a duplicate of 14-AREPL-MW6-GW and sample 14-AREPL-MW80-GW was collected as a duplicate of 14-AREPL-MW8-GW. This represents a field duplicate rate of 2 per 13 samples, which meets the data quality objective of 10% for VOCs. RPDs are typically calculated for all detected analytes for the primary and duplicate field sample using the following equation.

**EQUATION 5-1: RELATIVE PERCENT DIFFERENCE**

$$\text{RPD (\%)} = \text{Absolute Value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where  $R_1$  = Sample Concentration

$R_2$  = Field Duplicate Concentration

RPD was only able to be calculated for one of the six VOC analytes, PCE, as shown in Table 5-2. All other analytes were non-detect and RPD could not be calculated. The RPDs for PCE were below the data quality objective of 30% for water samples. No results are qualified due to duplicate precision.

**TABLE 5-2: CALCULATED RELATIVE PERCENT DIFFERENCES**

Analyte	Units	14-AREPL-MW6-GW Primary	14-AREPL-MW60-GW Duplicate	RPD ≤ 30	Flag
Tetrachloroethene	ug/l	1600	1700	6	
Analyte	Units	14-AREPL-MW8-GW Primary	14-AREPL-MW80-GW Duplicate	RPD ≤ 30	Flag
Tetrachloroethene	ug/l	0.81	0.82	1	

The RPDs for the LCS/LCSD were calculated and reported by OnSite and TestAmerica. All were within laboratory control limits. LCS/LCSD were reported by Pace for CSIA, as QC-1 and QC-2, but no RPD was calculated. LCS was reported by SiREM for Dhc and vcrA as positive control samples, but an LCSD was not reported; therefore RPD could not be calculated.

Site-specific matrix spike (MS) and matrix spike duplicate (MSD) samples were not designed for this project. RPDs for the MS/MSD were calculated and reported by OnSite and TestAmerica. All were within laboratory control limits. MS/MSD were not reported by Pace for CSIA or by SiREM for Dhc and vcrA.

No qualifications are made based on precision.

## 5.6.4 Accuracy

Accuracy was assessed by calculating the percent recovery for LCS, LCSD, MS, MSD, and surrogates. Surrogate recoveries represent the extraction efficiencies for groups of analytes within a sample. LCS, LCSD, MS, MSD, and surrogate recoveries were reported by OnSite and TestAmerica. All LCS and LCSD recoveries were reported within laboratory control limits. All MS and MSD recoveries were reported within laboratory limits. All surrogate recoveries were reported within laboratory limits with one exception: the surrogate fid was outside acceptable limits for sample 14-AKRE-Cuttings for GRO analysis. This result is flagged “J” as estimated due to QC criteria not being met.

LCS and MS recoveries were reported by SiREM with the notation that laboratory QC criteria had passed. Recoveries were not reported by Pace.

### **5.6.5 Representativeness**

All samples were collected in accordance with the approved work plan. Samples collected are considered representative of site conditions that are being characterized.

### **5.6.6 Comparability**

Samples were submitted to four laboratories, but each for different analyses. There is no comparison possible between laboratories for the same analyses. Samples were not screened or otherwise analyzed prior to laboratory submittal. There is no comparison possible between screening and sample results. Samples have not been consistently sampled over time at the site to provide temporal comparison.

### **5.6.7 Completeness**

All data that were requested were reported. Although LCS, LSCD, MS, MSD, and surrogate data were not reported by Pace and SiREM, standard operating procedures were used for all analyses, and data can be considered complete. No data were rejected; 100% of the results are usable with the applicable qualifications.

### **5.6.8 Sensitivity**

Sensitivity is assessed by ensuring that the limits of detection are less than the project-required goals and that any blank results are less than the PQLs.

There are no project-required goals for the results reported by Pace, SiREM, and TestAmerica. The results reported by OnSite were all less than the project-required goals with three exceptions: the PQL for TCE was greater than the cleanup level for sample 14-AREPL-MW5-GW, 14-AREPL-MW6-GW, and 14-AREPL-MW60-GW. Note that the PQL for some results are the MDL instead of the RL due to the failure to meet the cleanup level. No results are qualified based on the limits of detection.

One trip blank was submitted with water volatile samples (14-AREPL-TB) and one trip blank was submitted with soil volatile samples (14-AKRE-TB). This meets the data quality objective of one per cooler for VOCs. Both trip blanks were analyzed by the same method as the respective project samples. All results in both trip blanks were non-detect and less than the PQL. No qualifiers are necessary based on trip blank results.

Method blanks were reported by OnSite and TestAmerica. The method blanks were reported per matrix, analysis, and 20 samples. All method blank results were non-detect and less than the PQL. No qualifiers are necessary based on method blank results.

Per the approved work plan, equipment blanks and decontamination blanks were not collected for this project.

No results required qualification based on sensitivity.



## **6.0 CONCEPTUAL SITE MODEL – GROUNDWATER**

A conceptual site model (CSM) was prepared as part of the Site Characterization Report prepared by OASIS Environmental, Inc. in 2008 and updated in 2012. Based on the Site Inspection report from February 2013 (E&E, 2013) and the data collected in this report, an updated CSM is provided in the following sections, solely focusing on the groundwater media.

### **6.1 Sources**

Potential sources for the Alaska Real Estate Parking Lot are described in detail in the February 2013 Site Inspection report (E&E, 2013). The sources include a wood crib and associated underground collection sumps located near the former NC Tire Center property, a log crib located near the former C and K Cleaners property, and four buried drums marked for dry cleaning use near the former C and K Cleaners property. Petroleum underground storage tanks and hoists were also located in the area but have been removed and no evidence of petroleum impacts remains. Other sources may have included leaking disposal lines and general housekeeping practices that were common at the time. A secondary source of contamination appears to be PCE-impacted soil in the subsurface at the site.

Evidence found during this focused groundwater characterization indicates that a separate source from the Alaska Real Estate Parking Lot site may be present downgradient of the site. That source is unknown at this time.

### **6.2 Contaminants of Potential Concern**

COPCs based on historic groundwater sampling in the area are VOCs, specifically PCE and TCE. Daughter products cDCE, tDCE, and VC and other VOCs have been found in select areas downgradient, but are not verified to be from the Alaska Real Estate Parking Lot source.

### **6.3 Potential Migration Pathways**

Impacted groundwater has migrated to the northeast and north from the site toward Ingra Street in the upper aquifer that is confined by the Bootlegger Cove clay formation at approximately 50 feet bgs. From groundwater, volatile contamination is likely volatilizing to air (as evidence by air impacts). Sediment samples indicate that there are no impacts from groundwater to the sediment. VOCs are not typically taken up by biota and so uptake by plants or animals is unlikely. There is a data gap as to whether the impacted groundwater is flowing to the Ship Creek surface water body. A surface water body was identified during the 2014 field event and located south of monitoring well 4GMW-14 and within the fenced area of the former Alaska Native Hospital property. This may be groundwater daylighting at the bluff, but remains a data gap as to whether surface water is impacted.

### **6.4 Potential Exposure Routes**

The area of the groundwater plume is located within the municipal drinking water system, and it appears that no private drinking water wells are located in the area (E&E, 2013). Surface water from Ship Creek is not used as a resource for recreation, or for drinking water in the area

downgradient of the site (E&E, 2013). The surface water located south of 4GMW-14 is within a fenced area and not likely used; however, it may be an exposure route to wildlife if impacted.

## **6.5 Potential Receptors**

Due to the lack of exposure routes, it is not likely there are any receptors to impacted groundwater.

## **7.0 CONCLUSIONS AND RECOMMENDATIONS**

Ahtna conducted a focused groundwater characterization of the Alaska Real Estate Parking Lot site for ADEC. The scope of work included installation of four new monitoring wells in the downgradient portion of the plume; decommissioning of four monitoring wells in the source area at the site; sampling 13 monitoring wells for a combination of COPCs, MNA parameters, CSIA, and microbial tracing; and continual measurement of groundwater elevations in the downgradient area.

### **7.1 Conclusions**

The following summarizes the findings of the focused groundwater characterization:

- Groundwater flow direction is variable within the plume. At the site, flow direction was measured to the northeast, which is consistent with historical findings. However, as groundwater reaches the bluff area north of the former Alaska Native Hospital, groundwater flow begins to turn northward. Continual measurements from wells below the bluff show that prevailing groundwater flow direction is westward. The important implication of this is that there is a high potential for another source(s) in the Ship Creek industrial area to contribute to and change the chemical signature of the plume associated with the Alaska Real Estate Parking Lot.
- The monitoring wells at the site have elevated concentrations of PCE with no apparent degradation compounds present. In contrast, the wells at the base of the bluff have little to no measurable PCE and varying ratios of TCE, cDCE, tDCE, and VC concentrations, some of which exceed groundwater cleanup levels. The presence of petroleum hydrocarbons in the downgradient wells also was evident in visual and olfactory observations, although no chemical analysis was performed.
- MNA parameters were measured in two source area wells (MW-5 and MW-6) and two downgradient wells (MW-28 and 4GMW-15). The source area wells do not exhibit conditions indicative of or conducive to biodegradation, and the historically static PCE concentrations in MW-5 and MW-6 support this finding of the MNA parameters. On the other hand, MNA results for MW-28 and 4GMW-15 show the appropriate contrasts compared to background to indicate that biodegradation is likely occurring. These contrasts include elevated ethane and ethene concentrations that indicate complete reductive dechlorination of PCE and vinyl chloride, respectively.
- Microbial analysis of the source area wells MW-5 and MW-6 showed the absence of Dhc bacteria, which indicates that biodegradation is highly unlikely to occur under current conditions. On the other hand, Dhc was found in the downgradient well MW-28. Groundwater from MW-28 also showed the presence of the *vcrA* gene at a similar concentration as Dhc, which suggests that the Dhc population at MW-28 likely contains the *vcrA* gene and that complete reductive dechlorination of PCE to ethene is highly possible.
- CSIA results indicate that the PCE in MW-5 and MW-6 is more degraded than the PCE at MW-28 based on isotopic signatures; however, the other lines of evidence (actual PCE concentrations, MNA parameters, microbial analyses) all indicate that degradation is not occurring at an appreciable level in the source area wells while the

same lines of evidence indicate degradation is occurring in MW-28. The most likely explanation for this contradiction in CSIA results is that another source(s) of chlorinated ethenes exists near MW-28. The changing groundwater flow direction from northeast at the site to west at the downgradient wells adds credibility that another source may be contributing the Alaska Real Estate Parking Lot plume in the downgradient area.

## **7.2 Recommendations**

The following highlights recommendations for addressing the groundwater contamination at the Alaska Real Estate Parking Lot site:

- In terms of the downgradient characterization of the groundwater plume, the distal end of the plume remains potentially undefined. Given that groundwater flow is now better understood based on continuous measurements, additional borings and wells west of MW-28 and south of 4GMW-15 and DPB24 should help fill the data gap as to where the plume ends.
- Continue datalogging of groundwater elevations to understand potential seasonal variations in groundwater flow direction.
- Sample potential groundwater seep located within the former Alaska Native Hospital lot south of well 4GMW-14 to evaluate impacts to surface water.
- Perform a thorough data review of historical sampling activities and results of investigations in the Ship Creek area to document potential upgradient sources that are or have contributed to the Alaska Real Estate Parking Lot plume.
- Given the lack of apparent receptors for groundwater contamination, consider developing alternate groundwater cleanup levels per 18 AAC 75.345(b)(2) as part of the remedial strategy.
- Complete the proposed focused feasibility study for the groundwater plume, and implement the preferred remedial alternative(s) to address groundwater contamination.

## **8.0 REFERENCES**

Alaska Department of Environmental Conservation (ADEC), 2014. *Alaska Real Estate Parking Lot, Contaminated Sites Database*, access online at [http://dec.alaska.gov/Applications/SPAR/CCReports/Site\\_Report.aspx?Hazard\\_ID=4084](http://dec.alaska.gov/Applications/SPAR/CCReports/Site_Report.aspx?Hazard_ID=4084), August 15.

Ecology and Environment (E&E), 2013. *Fourth Avenue and Gambell Parking Lot Site Inspection, Anchorage, Alaska*, Contract Number EP-S7-06-02, Technical Direction Document Number 12-01-0004. February.

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## TABLES

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**Table 1: Point Location Data  
Focused Groundwater Characterization  
Alaska Real Estate Parking Lot, Anchorage, AK**

Well ID	Existing? (as of 5/23/14)	Northing	Easting	Well Elevation	Ground Elevation Adjacent to Well	Source of Horizontal Position
BH01GW	NO	2637538.2	1663323.8	-----	-----	Ecology and Environment
BH02GW	NO	2637526.8	1663240.8	-----	-----	Ecology and Environment
BH03GW	NO	2637450.9	1663360.3	-----	-----	Ecology and Environment
BH04GW	NO	2637521.2	1663069.9	-----	-----	Ecology and Environment
BH05GW	NO	2637462.6	1663208.4	-----	-----	Ecology and Environment
BH06GW	NO	2637358.3	1663353.2	-----	-----	Ecology and Environment
BH07GW	NO	2637462.1	1663279.7	-----	-----	Ecology and Environment
BH08GW	NO	2637376.6	1663201.8	-----	-----	Ecology and Environment
BH09GW	NO	2637404.2	1663281.8	-----	-----	Ecology and Environment
BH10GW	NO	2637629.8	1663481.9	-----	-----	Ecology and Environment
BH11GW	NO	2638079.4	1663682.6	-----	-----	Ecology and Environment
BH12GW	NO	2638443.2	1663803.8	-----	-----	Ecology and Environment
BK01GW	NO	2637257.1	1663276.1	-----	-----	Ecology and Environment
DPB24	YES	2638670.3	1663195.7	37.22	37.45	Ahtna Engineering
MW-12S	YES	2638778.7	1663644.9	38.64	38.61	Ahtna Engineering
MW-13	YES	2638757.8	1663767.2	-----	-----	Ahtna Engineering
MW-1	NO	2637460.2	1663239.0	121.29	121.65	Karabelnikoff Surveying
MW-2	NO	2637473.8	1663192.1	120.33	120.35	Karabelnikoff Surveying
MW-3	NO	2637482.5	1663270.1	-----	122.05	Karabelnikoff Surveying
MW-4	NO	2637370.2	1663242.6	-----	121.45	Karabelnikoff Surveying
MW-5	YES	2637537.4	1663288.8	124.97	122.45	Karabelnikoff Surveying
MW-6	YES	2637580.4	1663343.2	124.52	122.15	Karabelnikoff Surveying
MW-7	YES	2637353.8	1663204.7	120.67	121	Karabelnikoff Surveying
MW-8	YES	2637643.6	1663553.0	122.18	122.6	Mammoth Consulting
MW-9	YES	2637523.9	1663604.9	122.61	123	Mammoth Consulting
MW-10	YES	2637527.5	1663747.0	121.04	121.5	Mammoth Consulting
MW-11	NO	2637395.0	1663638.6	121.91	122.3	Mammoth Consulting
4GMW-12	YES	2637984.8	1663885.1	85.44	85.94	Ahtna Engineering
4GMW-13	YES	2638387.3	1663923.6	43.25	43.4	Ahtna Engineering
4GMW-14	YES	2638478.7	1663780.3	39.9	40.23	Ahtna Engineering
4GMW-15	YES	2638690.8	1663501.1	36.76	37.06	Ahtna Engineering
MW-28	YES	2638599.3	1663608.5	40.24	37.35	Karabelnikoff Surveying
EMP-02	NO	2637475.6	1663378.4	-----	-----	Estimated from historic figures
EMP-03	NO	2637374.8	1663421.7	-----	-----	Estimated from historic figures
PENCO MW-1	NO	2638353.3	1663912.9	-----	-----	Estimated from historic figures
PENCO MW-2	NO	2638353.5	1663973.8	-----	-----	Estimated from historic figures
AKRR MW-22	YES	2638758.0	1663044.4	-----	-----	Ahtna Engineering
AKRR MW-24S	YES	2638917.9	1663202.4	32.43	32.64	Karabelnikoff Surveying
AKRR MW-25	YES	2638921.0	1663201.9	-----	-----	Ahtna Engineering
WP 6	NO	2638828.2	1663229.2	35.6	34.5	Karabelnikoff Surveying
WP 8	NO	2637780.1	1663492.0	121.95	120.25	Karabelnikoff Surveying
WP 9	NO	2637742.1	1663787.8	121.69	119.95	Karabelnikoff Surveying
WP 10	NO	2637735.7	1663204.6	121.81	120.05	Karabelnikoff Surveying
WP 11	NO	2637891.4	1663699.8	122.26	120.45	Karabelnikoff Surveying
WP 12	NO	2638007.8	1663744.1	121.67	119.95	Karabelnikoff Surveying
WP 13	NO	2638027.0	1663423.8	121.7	118.65	Karabelnikoff Surveying
WP 14	NO	2638192.8	1663438.3	120.44	118.75	Karabelnikoff Surveying
WP 15	NO	2638055.9	1662832.7	118.69	116.95	Karabelnikoff Surveying
MW B 3	NO	2638675.0	1663961.3	39.27	39.6	Karabelnikoff Surveying

**Units:**

U.S. Survey Feet  
Horizontal Datum: NAD83 (2011)  
Vertical Datum: NAVD88  
Coordinate System: Alaska State Plane Zone 4

**Note:**

Horizontal and Vertical data has been compiled from multiple sources: Ahtna Engineering survey data (2014) ,  
- Ahtna Engineering survey data (2014), collected in May 2014  
- Ecology & Environment GPS data (2013), reported in E&E Inspection Report from February 2013  
- Mammoth Consulting survey data (2011), reported in OASIS Environmental Report from March 2012  
- Karabelnikoff Surveying survey data (2008), reported in CH2M Hill Technical Memorandum from 11/7/08  
(Elevation data from Karabelnikoff Surveying was reported in NGS 1972 adjustment of Mean Sea Level Datum.)  
(A constant offset of 6.05' has been added to 1972 values in attempt to convert those elevations into NAVD88.)

**Table 2: ColorTec Screening Results**  
**Focused Groundwater Characterization**  
**Alaska Real Estate Parking Lot, Anchorage, AK**

Borehole ID	Depth (ft bgs)	Color-Tec Reading (ppm)
4GMW-12	18	0
	20	0
	22.5	0
	24.5	0
	27	0
	30	0
4GMW-13	10	0
	13	0
	15	0
	16	3*
	19	0
4GMW-14	10	0
	11	0.5
	13	0
	13.5	0
4GMW-15	6.5	0
	10	0
	11	1
	14	0

**Note:**

\* This result was not reproducible and may be erroneous.

ft bgs = feet below ground surface

ppm = parts per million

**Table 3: Groundwater Monitoring Results  
Focused Groundwater Characterization  
Alaska Real Estate Parking Lot, Anchorage, AK**

Sample ID	Area	Date	Time	Water Level (ft BTOC)	Total Depth (ft BTOC)	Temperature (°C)	pH (pH units)	Conductivity (µS/cm <sup>Ⓢ</sup> )	ORP (mV)	DO (mg/L)	Turbidity (NTU)
14-AREPL-MW10-GW	Background	5/15/2014	16:00	42.88	48.50	8.53	6.28	0.995	97.5	11.15	319
14-AREPL-4GMW-12-GW	Boundary	5/14/2014	14:30	18.68	28.57	7.15	7.18	0.611	18.4	0.17	6.32
14-AREPL-4GMW-13-GW	Boundary	5/15/2014	13:00	8.45	12.60	4.59	6.26	0.810	-17.4	0.28	13.9
14-AREPL-DPB24-GW	Boundary	5/14/2014	10:45	6.57	11.82	4.11	6.08	0.606	51.0	0.35	18.0
14-AREPL-MW12S-GW	Boundary	5/13/2014	13:45	6.45	9.35	4.80	6.29	0.208	37.6	2.31	11.9
14-AREPL-MW13-GW	Boundary	5/13/2014	15:30	6.95	9.2	4.71	6.35	0.336	26.6	5.05	5.85
14-AREPL-MW5-GW	Source Area	5/14/2014	17:45	43.26	50.0	9.81	6.56	0.601	66.9	3.16	345
14-AREPL-MW6-GW	Source Area	5/13/2014	17:00	44.0	50.2	7.26	6.40	0.610	160	2.97	21.0
14-AREPL-MW7-GW	Source Area	5/13/2014	10:30	36.7	47.1	8.36	6.55	0.644	221.3	4.15	35.7
14-AREPL-MW8-GW	Dissolved Plume	5/14/2014	12:45	43.57	46.92	7.61	6.32	0.339	131.6	1.00	22.0
14-AREPL-4GMW-14-GW	Downgradient	5/15/2014	14:45	5.84	13.22	6.32	6.60	0.733	-44.7	0.24	107
14-AREPL-MW28-GW	Downgradient	5/14/2014	16:00	8.85	11.17	6.03	6.66	0.601	-9.3	0.48	1.14
14-AREPL-4GMW-15-GW	Downgradient	5/15/2014	10:45	5.20	9.10	6.10	6.36	0.796	-20.3	0.86	12.2

**Note:**

ft BTOC = feet below top of casing

°C = degrees Celcius

µS/cm<sup>Ⓢ</sup> = microSiemens per centimeter

mV = millivolts

mg/L = micrograms per liter

NTU = nephelometric turbidity units

**Table 4: Groundwater Sampling Results - Contaminants of Concern**  
**Focused Groundwater Characterization**  
**Alaska Real Estate Parking Lot, Anchorage, AK**

Well ID	Sample ID	Tetrachloroethene	Trichloroethene	(cis) 1,2-Dichloroethene	(trans) 1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride
4GMW-12	14-AREPL-4GMW-12-GW	U (0.20)	U (0.20)	U (0.20)	U (0.20)	U (0.20)	U (0.20)
4GMW-13	14-AREPL-4GMW-13-GW	U (0.20)	U (0.20)	U (0.20)	U (0.20)	U (0.20)	U (0.20)
4GMW-14	14-AREPL-4GMW-14-GW	U (0.40)	U (0.40)	<b>81</b>	0.79	U (0.40)	<b>9.8</b>
4GMW-15	14-AREPL-4GMW-15-GW	U (0.20)	0.86	8.9	0.27	U (0.20)	<b>9.6</b>
DPB-24	14-AREPL-DPB24-GW	U (0.20)	U (0.20)	U (0.20)	U (0.20)	U (0.20)	U (0.20)
MW-10	14-AREPL-MW10-GW	U (0.20)	U (0.20)	U (0.20)	U (0.20)	U (0.20)	U (0.20)
MW-12S	14-AREPL-MW12S-GW	U (0.20)	U (0.20)	0.25	U (0.20)	U (0.20)	U (0.20)
MW-13	14-AREPL-MW13-GW	U (0.20)	U (0.20)	0.26	U (0.20)	U (0.20)	U (0.20)
MW-28	14-AREPL-MW28-GW	<b>150</b>	<b>31</b>	<b>310</b>	4.5	U (2.0)	<b>41</b>
MW-5	14-AREPL-MW5-GW	<b>1100</b>	U [5.5]	U (10)	U (10)	U [3.4]	U [3.1]
MW-6	14-AREPL-MW6-GW	<b>1600</b>	U [5.5]	U (10)	U (10)	U [3.4]	U [3.1]
	14-AREPL-MW60-GW	<b>1700</b>	U [5.5]	U (10)	U (10)	U [3.4]	U [3.1]
MW-7	14-AREPL-MW7-GW	<b>18</b>	U (0.20)	U (0.20)	U (0.20)	U (0.20)	U (0.20)
MW-8	14-AREPL-MW8-GW	0.81	U (0.20)	U (0.20)	U (0.20)	U (0.20)	U (0.20)
	14-AREPL-MW80-GW	0.82	U (0.20)	U (0.20)	U (0.20)	U (0.20)	U (0.20)
Trip Blank	14-AREPL-TB	U (0.20)	U (0.20)	U (0.20)	U (0.20)	U (0.20)	U (0.20)
Cleanup Levels		5	5	70	100	7	2

**Note:**

Samples were collected May 13-15, 2014

Units are micrograms per liter (ug/L)

Cleanup levels are from 18 AAC 75.345 Table C

Data in parentheses are practical quantitation limit (PQL)

Data in brackets are method detection limit (MDL)

Pink highlighting and bold text indicates the result is greater than cleanup level

Purple highlighting indicates the MDL is greater than cleanup level

U - Analyte not detected at the concentration shown

**Table 5: Groundwater Sampling Results - Monitored Natural Attenuation Parameters**  
**Focused Groundwater Characterization**  
**Alaska Real Estate Parking Lot, Anchorage, AK**

Well ID	Sample ID	Location	Iron	Nitrate+Nitrite	Sulfate	Total Organic Carbon	Methane	Ethane	Ethene
			(ug/L)	(mg/L)	(mg/L)	(mg/L)	(ug/L)	(ug/L)	(ug/L)
MW-10	14-AREPL-MW10-GW	Background	11000	4.7	29	1.8	0.23	0.0059 J	0.015 J
<i>Plume wells should be:</i>			<i>Higher</i>	<i>Lower</i>	<i>Lower</i>	<i>High</i>	<i>Higher</i>	<i>Higher</i>	<i>Higher</i>
MW-5	14-AREPL-MW5-GW	Source Area - PCE	8700	5.5	40	1.7	0.25	0.014 J	0.013 J
MW-6	14-AREPL-MW6-GW	Source Area - PCE	1100	4.9	42	1.6	0.026	0.018 J	0.015 J
MW-28	14-AREPL-MW28-GW	Downgradient - PCE, TCE, DCE, VC	170	0.16	46	3.1	260	0.11	4.9
4GMW-15	14-AREPL-4GMW-15-GW	Downgradient - VC	16,000	U (0.050)	U (5.0)	3.1	1300	0.30	6.3

**Notes:**

ug/L = micrograms per liter

mg/L = milligrams per liter

Green highlighting and bold text indicates the result is greater than cleanup level

J - Estimated concentration greater than the set method detection limit (MDL) and less than the set reporting limit (PQL)

U - Analyte not detected at the concentration shown

Data in parentheses are the PQL

PCE = tetrachloroethene

TCE = trichloroethene

DCE = dichloroethene

VC = vinyl chloride

**Table 6: Groundwater Sampling Results - Microbial Analysis**  
**Focused Groundwater Characterization**  
**Alaska Real Estate Parking Lot, Anchorage, AK**

Well ID	Sample ID	SiREM Sample ID	Sample Collection Date	Sample Matrix	Percent Dhc*	Dhc Enumeration/ Liter**	Percent vcrA^	vcrA
MW-5	14-AREPL-MW5-GW	DHC-10436	5/14/2014	Groundwater	NA	U ( $4 \times 10^3$ )	-	-
MW-28	14-AREPL-MW28-GW	DHC-10437	5/14/2014	Groundwater	0.04-0.1 %	$1 \times 10^6$	-	-
		VCR-4886			-	-	0.01-0.04 %	$4 \times 10^5$
MW-6	14-AREPL-MW6-GW	DHC-10438	5/13/2014	Groundwater	NA	U ( $3 \times 10^5$ )	-	-

**Notes:**

Dhc = Dehalococcoides

vcrA = vinyl chloride reductase A

NA = Not applicable

- = Not analyzed

U = Not detected, associated value is the quantification limit.

\* Percent Dhc in microbial population. This value is calculated by dividing the number of Dhc 16S ribosomal ribonucleic acid (rRNA) gene copies by the total number of bacteria as estimated by the mass of DNA extracted from the sample. Range represents normal variation in Dhc enumeration.

\*\* Based on quantification of Dhc 16S rRNA gene copies. Dhc are generally reported to contain one 16S rRNA gene copy per cell; therefore, this number is often interpreted to represent the number of Dhc cells present in the sample.

^ Percent vcrA in microbial population. This value is calculated by dividing the number of vcrA gene copies quantified by the total number of bacteria estimated to be in the sample based on the mass of DNA extracted from the sample. Range represents normal variation in enumeration of vcrA.

**Table 7: Groundwater Sampling Results - Compound Specific Isotope Analysis**  
**Focused Groundwater Characterization**  
**Alaska Real Estate Parking Lot, Anchorage, Alaska**

Monitoring Well	$\delta^{13}\text{C}$ (‰)	$\delta^{37}\text{Cl}$ (‰)	Accuracy ( $\pm$ ‰)	PCE ( $\mu\text{g/L}$ )	Natural Log of PCE Concentration
MW-5	-34.07	0.4	0.5	1100	7.0
MW-6	-33.79	0.31	0.5	1700	7.4
MW-28	-36.34	-1.21	0.5	150	5.0
4GMW-15	-33.43	0	2	U (0.20)	-

**Notes:**

$\delta^{13}\text{C}$  = relative abundance of two stable isotopes of carbon ( $^{13}\text{C}$  and  $^{12}\text{C}$ )

$\delta^{37}\text{Cl}$  = relative abundance of two stable isotopes of chlorine ( $^{37}\text{Cl}$  and  $^{35}\text{Cl}$ )

‰ = parts per thousand

PCE = tetrachloroethene

$\mu\text{g/L}$  = micrograms per liter

U = Analyte not detected at the concentration shown in parentheses

- = Not able to be calculated

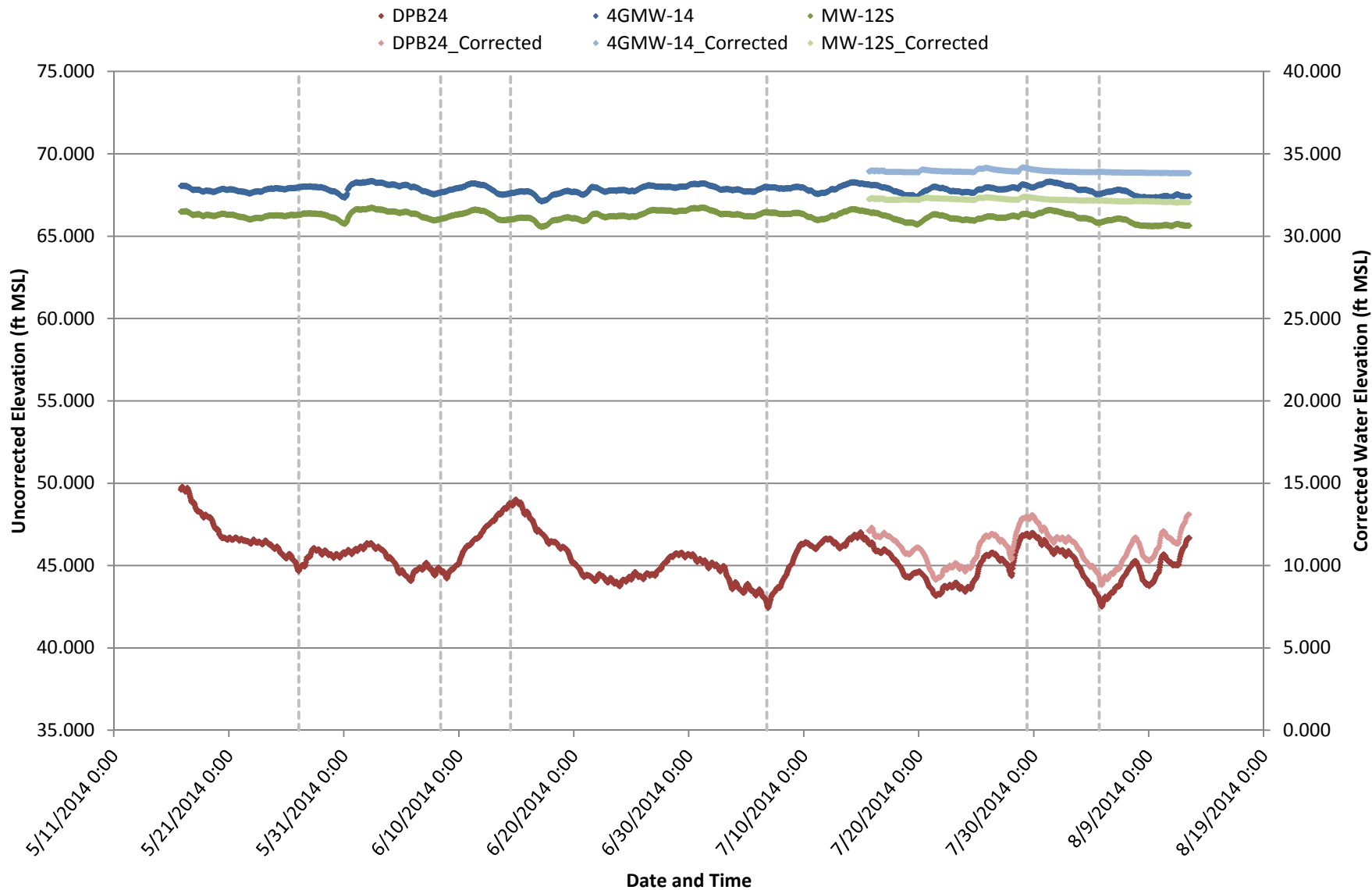
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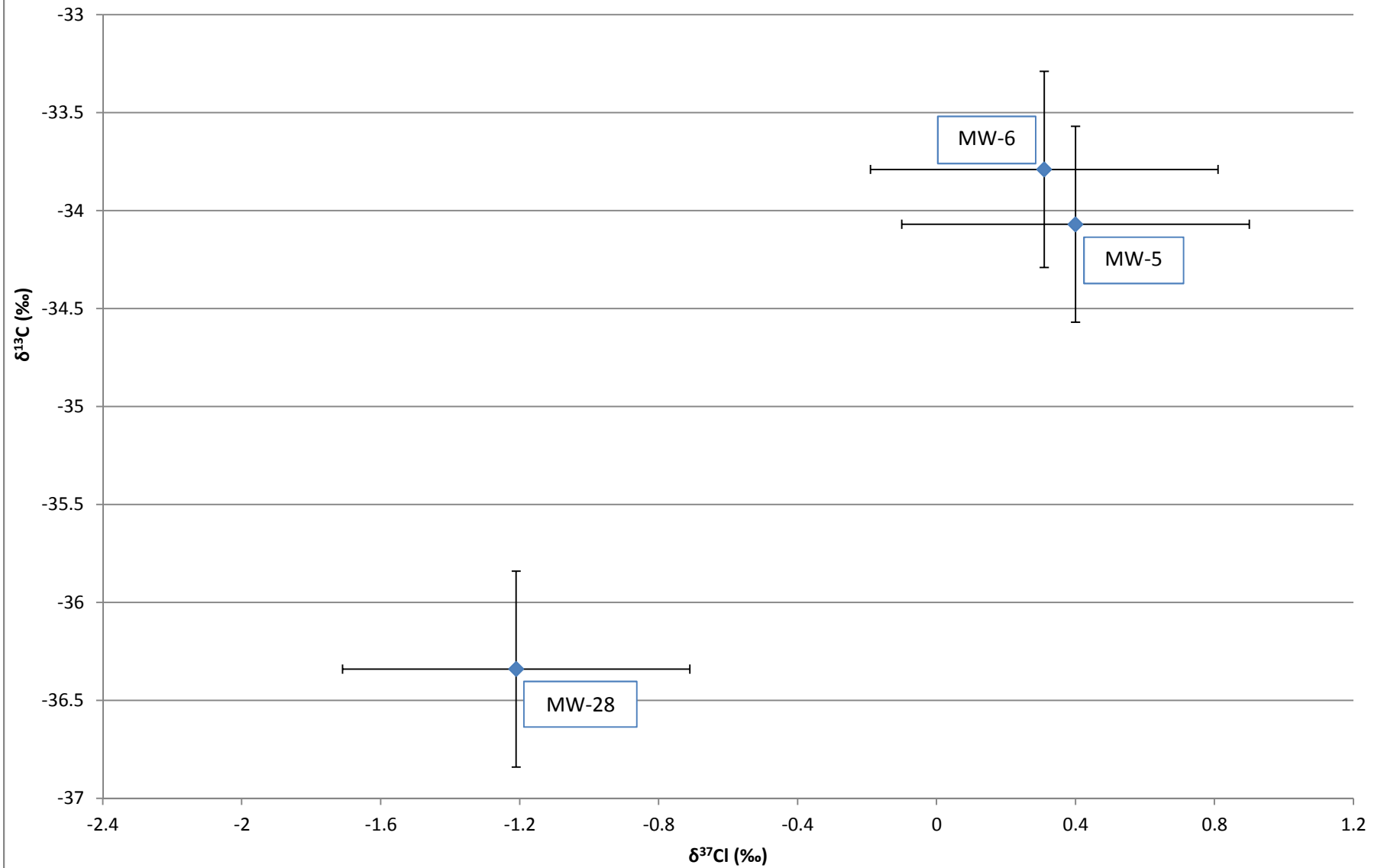
## CHARTS

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**Chart 1: Alaska Real Estate Parking Lot Datalogger Results**  
**May 16, 2014 to August 12, 2014 Water Level**

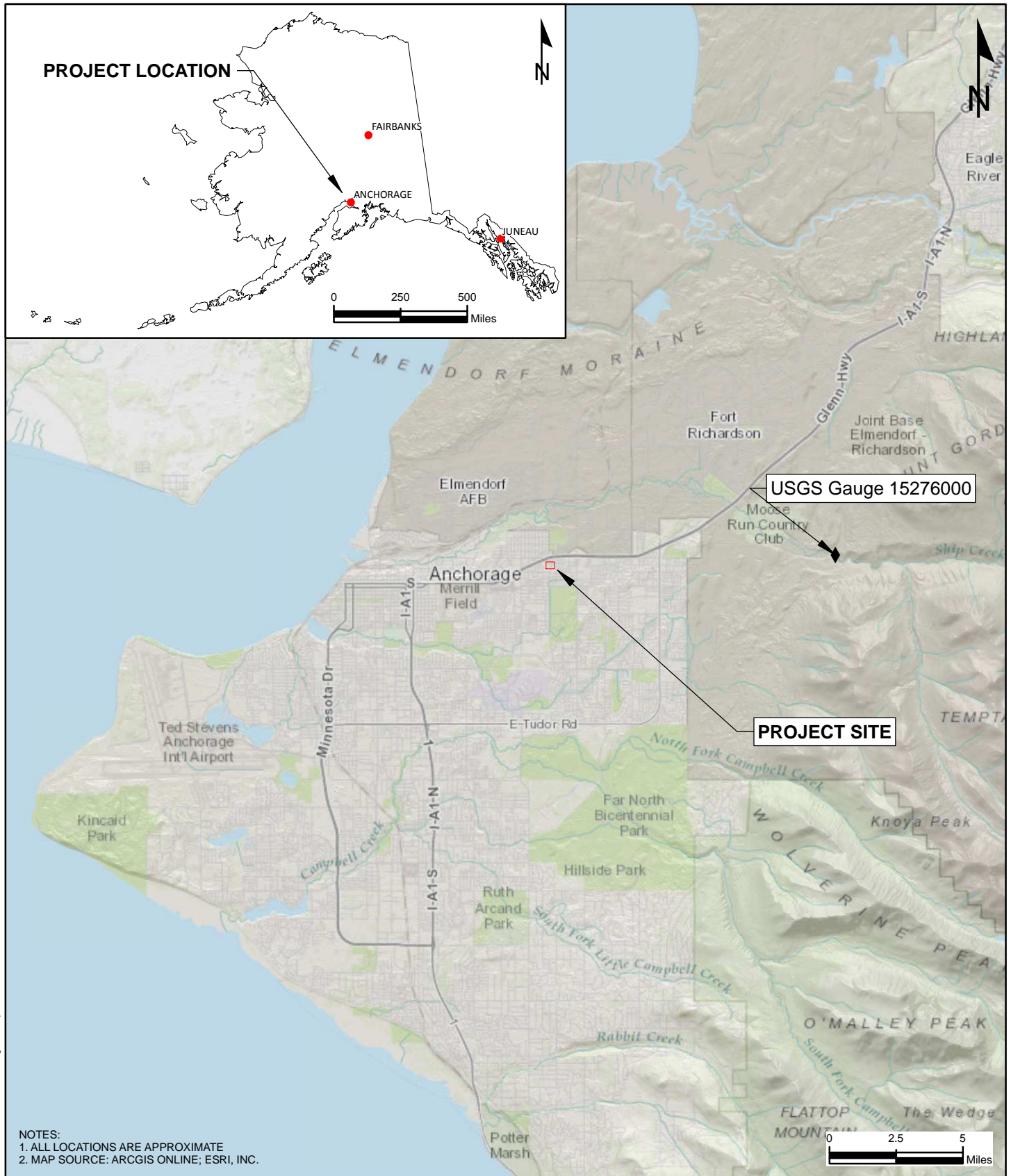


**Chart 2: Analysis of  $\delta^{13}\text{C}$  and  $\delta^{37}\text{Cl}$  in PCE  
Alaska Real Estate Parking Lot, Anchorage, Alaska**



## FIGURES

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## FOCUSED GROUNDWATER CHARACTERIZATION ALASKA REAL ESTATE PARKING LOT, ANCHORAGE, ALASKA



### STATE AND SITE VICINITY

Project Number: 20266.008	Figure Number: <b>1</b>
Date: 8/29/2014	
Drafted By: jbrann	





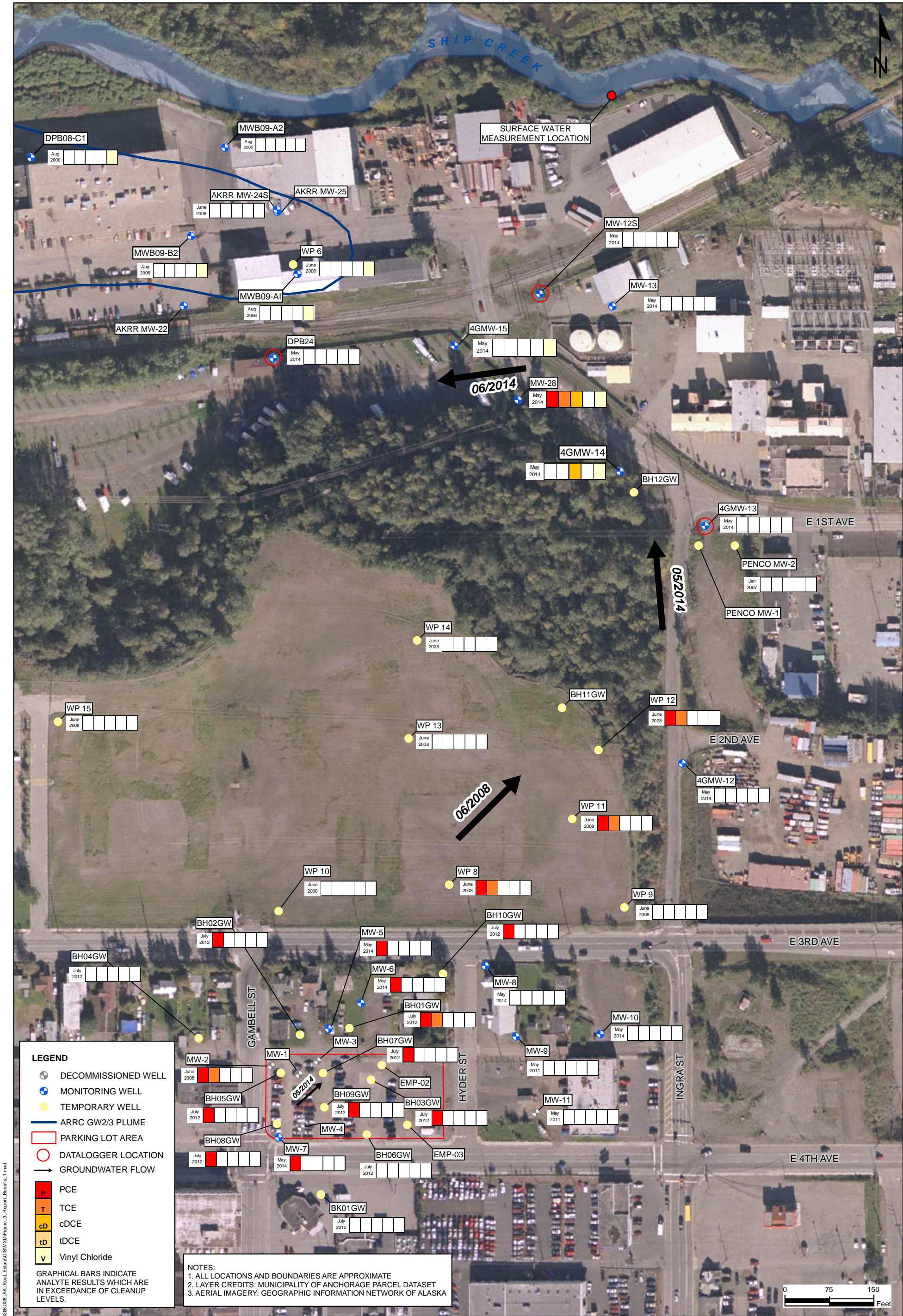
## FOCUSED GROUNDWATER CHARACTERIZATION ALASKA REAL ESTATE PARKING LOT, ANCHORAGE, ALASKA



Project Number: 20266.008	Figure Number: <b>2</b>
Date: 7/2/2014	
Drafted By: dhickey	

### SITE PLAN





Prepared by dhickey, 9/16/2014; L:\Anchorage\20266.008\_AK\_Real\_Estate\GIS\MXD\Figure\_3\_Report\_Results\_1.mxd

FOCUSED GROUNDWATER CHARACTERIZATION  
ALASKA REAL ESTATE PARKING LOT, ANCHORAGE, ALASKA

GROUNDWATER ANALYTICAL RESULTS



Project Number: 20266.008	Figure Number: <b>3</b>
Date: 9/16/2014	
Drafted By: dhickey	

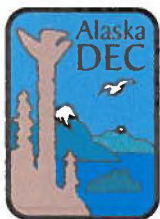


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## **APPENDIX A**

### **PERMITS**

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Alaska Department of Environmental Conservation  
Contaminated Sites Investigation -2014

## Limited Right of Entry for Hazardous Substances Investigation

STATE OF ALASKA

Project Reference: Hazard ID No: 4084

Database Name: Alaska Real Estate Parking Lot

Permission is hereby granted to the STATE OF ALASKA, Department of Environmental Conservation, its contractors, agents and employees, to enter upon our land in and/or in the vicinity of Anchorage Ship Creek RV Park 150 Ingra Street for the purpose of surface and subsurface investigation for hazardous substances.

This permission shall include the right to install a monitoring well and collect groundwater samples from this monitoring well and one historic monitoring well on property.

The State shall take all reasonable precautions to avoid damaging said lands and the appurtenances thereon, and in the event that any damage results from such investigations, the State, by making such entry, agrees to compensate the undersigned for such damage.

Prior to entering upon land pursuant to this Limited Right of Entry, the State or any of its contractors or employees shall (1) notify the undersigned of the time and place of the anticipated entry, and (2) afford the undersigned an opportunity to have one or more of its officials, employees, agents, or attorneys present during such entry.

This permission shall terminate six months from the date of execution of this Limited Right of Entry, unless extended or previously terminated in writing.

Date: 5/2/14

Mailing Address:

150 N INGRA  
ANCHORAGE AK 99501

By: \_\_\_\_\_

Signature

circle as applicable: property owner operator

Telephone: 277-0877

By: [Signature]

Signature

circle as applicable: property owner operator

Email (b) (6)

Address

John Sparr  
Printed Name(s)





**POST IN A CONSPICUOUS PLACE  
ALL WORK MUST BE INSPECTED**

Field Inspection Request required 2 working days in advance of starting work and 2 working days in advance for final inspection. Call (907) 343-8206 (voice recorder) for scheduling. Permit is not valid without the call-in and also must include the one-call ticket (utility locate) number.

MUNICIPALITY OF ANCHORAGE  
RIGHT OF WAY DIVISION  
4700 ELMORE ROAD  
TELEPHONE (907) 343-8240



# RIGHT OF WAY PERMIT

## R141243

Type: General      Grid: SW1232      Date Issued: 5/2/2014  
Construction Start:      Last Update by: PWDEW  
Last Updated: 05/02/2014

Permittee: GEOTEK ALASKA, INC.

Contact Person: Katherine Smith, 569-5900

Primary Inspector: F.Kelly 343-8436

Site Address: 115 N INGRA ST, Anchorage - @ 1st and 2nd Avenues

Legal Description: EAST ADDITION BLK 46A REM G:1232

**Original Work**

Description: Placement of two groundwater monitoring wells. One well located on the east side of Ingra Street near 2nd Avenue, 2' east of paved surface and 30' deep. One well located on the south side of North Ingra Street near 1st Avenue, 2' south of the paved surface and 20' deep.

**Change Orders Summary**

CO Date    CO #  
05/02/2014    R141243 - 1000

**New Work Description**

Change order to extend work dates and include additional monitoring well site. Total of 3 locations: east side of Ingra Street near 2nd Avenue; east side of Ingra Street near 1st Avenue; south side of North Ingra Street near 1st Avenue.

**Most Recent Summary**

**Work Area**

Ingra St @ 1st Ave	ROW	Boring	None	5/8/2014 12:00:00AM	5/11/2014 12:00:00AM
Ingra St @ 2nd Ave	ROW	Boring	None	5/8/2014 12:00:00AM	5/11/2014 12:00:00AM
North Ingra @ 1st Ave	ROW	Boring	Partial	5/8/2014 12:00:00AM	5/11/2014 12:00:00AM

**Financial Summary**

Fee Description

QTY

AMT

Total Fees:

**See reverse for requirements/remarks.**

I have read and understand both sides of this permit. I agree to the terms and conditions; and I certify that all work will comply with federal, state, and municipal codes and regulations and the provisions of this permit.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

5/2/14



Construction Requirements and Notes:

1 - The permittee shall post a copy of the permit in a conspicuous location at the place to which the permit pertains before any work there is started and shall remove the permit only after the Right of Way Inspector has accepted the work as being in compliance with the permit.

2- All construction shall be in accordance with the Municipality of Anchorage Standard Specifications (MASS), 2009 Edition, applicable municipal codes and regulations and the approved drawings and special provisions of this permit.

3-Permanent paving, recycled asphalt payment (RAP), chip seal, sidewalks and curb and gutter must be replaced within 7 working days after underground work is completed.

4 - This permit has been issued based on the assumption that the information contained in the plans and supporting information is correct. Any and all omissions are the responsibility of the permittee. Any change in the scope of work requires a revised or new permit and TCP.

5 - Permittee is responsible for locating and protecting all utilities and survey markers in the work vicinity. For locations, call "Locate Call Center of Alaska", (907) 278-3121 or (800) 478-3121.

6 - All underground installations within a public place shall be buried at a minimum depth of forty-two inches (42") below the final surface elevation i.e. bottom of drainage ditches, road shoulder, or finished grade.

7 - The right of way shall be restored to the same, if not better condition, than it was prior to the contractors' work being performed. The work shall be performed vigorously and continuously, until completed to the satisfaction of the Municipal Right of Way Inspector.

8 - Changes in the approved road closures or scope of work resulting from emergency circumstances may be allowed during construction. It shall be the responsibility of the contractor to notify the Permit Office 343-8206, and/or obtain an approved Traffic Control Plan (TCP). It shall be the contractor's responsibility to notify the following agencies: Fire Dispatch 267-4950, Police Dispatch 786-8900, Alaska State Troopers Dispatch 428-7200, People Mover 343-8253 and School Bus 742-1207 or 742-1209.

9 - The contractor shall erect signs, barricades and detours in accordance with the U.S. Department of Transportation "Manual on Uniform Traffic Control Devices", Part VI - Traffic Controls for Street and Highway Construction, Maintenance, Utility and Emergency Operations. Failure to do so may result in fines being assessed under Title 14 for work not in conformance with a permit.

10 - The Municipality has the right to inspect and/or reject materials and workmanship not to Municipal standards, to stop work until corrections are made, or to require removal of the facility and to charge time and equipment to the Permittee to correct the facility if they fail to comply with the conditions of the permit.

11- Contractors' acceptance of this permit constitutes acceptance of the Municipality's bonding requirements, and is contractor's

**MOA RIGHT OF WAY  
INSPECTION REQUEST LINE  
343-8206**

Requests must be received 2 working days in advance of starting work and 2 working days in advance for final inspection. Permit is not valid without the call-in and the utility locate number.

Call the voice message system at 343-8206 and give the following information in the order listed below:

1. Permit Number
2. Contractor Name
3. Contact Person
4. Phone Number
5. Start Date
6. Start Time
7. Project Location
8. Utility Locate Ticket Number

Utility companies (ACS, GCI, ML&P, AWWU, ENSTAR, CEA, MEA, MTA) must notify the Right of Way office a minimum of 24 hours prior of starting work.

Municipality of Anchorage – Right of Way Section  
Main Phone 343-8240 Fax 343-8250 7:30am – 4:30pm



## **APPENDIX B**

### **FIELD DATA SHEETS**

- B-1    FIELD NOTES**
- B-2    BORING LOGS AND WELL COMPLETION LOGS**
- B-3    GROUNDWATER SAMPLING DATA SHEETS**

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Name Ahtna Engineering Services

Address 110 W. 33<sup>th</sup> Ave. Suite 200A  
Anchorage, AK 99503

Phone 646.2969

Project Alaska Real Estate  
ADEC

**Rite in the Rain** — A patented, environmentally responsible, all-weather writing paper that sheds water and enables you to write anywhere, in any weather. Using a pencil or all-weather pen, *Rite in the Rain* ensures that your notes survive the rigors of the field, regardless of the conditions.

**RiteintheRain.com**

CONTENTS		
PAGE	REFERENCE	DATE
GeoTek Alaska Glenn	569.5900	
Emerald Alaska Maria	258.1558	
Ship Creek RV Lot John Saari	277.0877 cell (b) (6)	

5/7/14  
50°, Partly Cloudy

- 1000 Depart office for site.  
Will start by drilling well 4GMW-15 inside the boundary of Ship Creek RV lot.
- 1015 Meet with GeoTek Alaska drillers Glenn and Logan. Discuss plan.  
Meet with John Saari, the operator of Ship Creek RV lot to confirm access.  
No utilities designated in area around proposed 4GMW-15.
- 1030 Gauge well MW-28 on the corner (stick-up).  
Depth to water (DTW) is 8.88' from TOC.  
DTW = 6.06' from ground surface.  
Gauge well DPB24 near RV lot office bldg.  
DTW = 6.55' from TOC at ground surface.  
Casing is only 1-inch diameter. Tubing in well.
- 1045 Set up Color-Tec test kit for screening soils.
- 1100 Conduct health and safety briefing and Daily tailgate meeting with team.  
Label drum for soil cuttings as non-haz waste. Set up PID for air monitoring.
- 1115 Begin drilling well 4GMW-15. Drill down to 5' bgs with DT45 tooling. Retrieve soil in plastic sleeve from 5-10' and 10-15' bgs.

Open Street 5/7/14

## Return to the Rain



O. Stewart  
A. Geilich20266.008  
AK Real Estate

5/7/14

Cont. Soil is sandy gravel with fuel impacts observed by odor & color. (boning log) ColorTec screening samples collected at 10.5' - 0ppm

10' - 0ppm

14' - 0ppm.

11' - 1ppm

Confining Layer at 10.5' bgs.

Set well 4-9 bgs. (well construction log) screen

Excess cuttings placed in 55-gal drum Labelled non-hazardous and placed at the corner of 1st and Ingra streets.

1315 Done with well completion and off-site for lunch.

Get 2 additional drums from GeoTek Alaska Shop.

1415 Back to 4th & Gambell parking lot.

Uncover MW-3. Unable to knock out well bottom because well is nearly full of dirt/bentonite. Fill up remaining ~7 ft. with bentonite chips hydrated in place. Take out steel mount and backfill with native material.

GPS coordinate collected before decomm.

O. Stewart 5/7/14

O. Stewart  
A. Geilich20266.008  
AK Real Estate

5/7/14

1440 To MW-1 and uncover. PVC full of dirt/bentonite. Dig out around the concrete apron. Remove steel mount.

Backfill with native material & pea gravel.

1500 To MW-4 and uncover. PVC nearly full of dirt/bentonite. Backfill ~30 ft. with bentonite chips hydrated in place. Dig out around the monument and apron. Apron strangely made of cold patch. Remove steel mount.

1515 To MW-2 and uncover. PVC nearly full of dirt/bentonite. Backfill ~15 ft. with bentonite chips hydrated in place. Dig out around mount and apron. Apron of cold patch. Remove mount. Backfill with native material and pea gravel.

Since no PVC removed from the ground, no hazardous waste generated. Monuments taken as debris for disposal by GeoTek.

1530 Finish up daily quantities with drillers. Off site for the day.

O. Stewart 5/7/14



O. Stewart  
A. Geilich20266.008  
AK Real Estate

5/8/14

- 0815 Leave office for site.  
Meet up with Geotek drillers Glenn and Logan.  
Check out site for well 4GMW-12. In front of  
Grubstake Realty driveway. No utility  
conflicts.  
Set up Colortec and get drill rig situated.
- 0915 Go thru Daily Tailgate Safety Meeting.
- 0930 Begin drilling 4GMW-12. Drill down to 15'  
with no recovery. Recover soil from 15-20'.  
Water ~18'. Sample to 30'. Heaving sands.  
Clay tagged at 30'. (see boring log)  
Will set well screen from 29-29'. (see well  
construction log.)
- 1300 Finish well 4GMW-12.  
Mobilize to 4GMW-13. Set up on spot.  
Nearby utilities, but no conflicts.
- 1330 Begin drilling 4GMW-13. Drill down to 5'  
with no recovery. Recover soil 5-20'.  
Unable to get sleeve from sample  
barrel for 5-10' section. Collect from end  
of barrel. Clay at 15'. (see boring log).  
Well screen 8.5-13.5' bgs.
- 1400 Will finish mount and concrete later.  
Move to 4GMW-14.

Op flint 5/8/14O. Stewart  
A. Geilich20266.008  
AK Real Estate

5.8.14

- 1415 Begin drilling 4GMW-14. Drill down to 5' bgs.  
Recover soil from 5-15' bgs. Unable to  
retrieve soil from 5-10' sample barrel.  
Collect from end of barrel. Clay at 13.5'.  
(see boring log).  
Well screen ~~8-13.5'~~ 8.5-13.5'.
- 1630 Finish drilling and setting well. Start on  
completions of both wells in flush  
mounts in concrete.  
All soil cuttings placed in drum labelled  
non-hazardous and left on site near  
telephone pole on west side of Ingra  
at the intersection with 1st/Warehouse.  
No purge or decon water generated.  
All other low - gloves, paper towels, plastic  
bags, etc placed in 2 garbage bags for  
disposal at Anchorage regional Landfill.
- 1700 Off site for the day.

Op flint 5.8.14*Rite in the Rain*



6

A Geilich  
D Hickey20266.008  
AK Real Estate

5/9/14

- 1240 - Arrive at site, discuss plan to survey monitoring wells
- Conduct Health & Safety Meeting
  - Surveying data will be collected in notebook by D Hickey.
- 1715 off site for day. Survey will be finished another day

NOTE: O. Stewart on site at 1630 to collect sample of drummed soil cuttings for waste disposal  
14-AKRE-Cuttings.

AG

E. Freitas

O. Stewart

20266.008

AK Real Estate

5/13/13

7

0840 At office. Calibrate UST  
Serial NO: 04.F10639 AD

<del>pH</del>	initial	final
pH	3.72	4.00
	7.13	7.00
	9.86	9.99
ORP	261.4	240.0
spec cond	1.428	1.413
D.O.	98.7%	100%

940 On site mw-7  
O. Stewart, E. Freitas

1000 Depth to water 36.7'

1018 Begin pumping.

1045 Parameters stable collect sample,

1100 offsite. Go to dump water, ppe into drums

1130 mop to mw-6.

1134 On site mw-6.

1147 Not enough time to sample. off site

Return to the Rain.



8 S. Fox 20266.008  
E. Freitas AK Real Estate 5/13/14

1230 On site M&P with S. Fox  
1235 Arrive at MW-12G  
1250 Begin pumping  
1300 ~~Tubing~~ NO flow. changed  
Out tubing.  
1310 Began pumping  
1324 Began field parameters  
DTW = 6.3  
1350 Parameters stabilize,  
collected sample  
14-AKREPL-MW12S-GW  
1400 Measure DTW for  
datalogger. DTW = 6.3  
There was a bit of  
trouble with the well  
cap. Subtract 0.3' in  
from depth because  
wire was run to top  
of well cap.  
1430 Off-site. Mob to MW-13.  
Well is Western most  
of two wells.  
1450 Begin pumping.  
1505 Begin measuring  
field parameters.

E. Freitas 20266.008  
S. Fox AK Real Estate 5/13/14 11

1530 Parameters stabilize.  
Collect 14-AKREPL-MW13-GW  
1600 Dumped purge water  
into tanks  
1620 Arrive at MW-6  
1630 Take DTW.  
1640 Start purge  
1704 Parameters stabilize.  
1708 Collect  
14-AKREPL-MW6-GW  
and  
duplicate  
14-AKREPL-MW6-GW.  
Duplicate is for VOC only.  
1800 Site Cleanup and labeling  
1830 Off-site  
1835 Dump purge water into  
drums.  
1900 Return to office  
Place samples in sample  
fridge.  
5/13/14



A Gelich 5/13/14

- 0930 - arrive at 46 MW-12
- decon pump with alconox & water rinse
  - Conduct Health & Safety meeting
- 0944 - Take water level DTW = 18.73 ft  
DT bottom well = 28.55 ft  
9.82 ft water in well, = 1.67 gallons  
Development to proceed to 16.7 gallons which is 10 well volumes
- 0959 start purge with submersible pump
- 1053 stop purge at 23 gallons. water beginning to clear last few gallons
- 1055 - take water level readings. same as above  
- bring purge water to accumulation area
- 1135 - arrive at 46 MW-13  
depth to water = 8.51 ft  
depth to bottom well = 12.69 ft  
water in casing = 4.18 ft Well volume: 0.71 gal  
7.14 gallons = 10 well volume
- decon pump
- 1201 - start purge & surge  
- observe heavy fuel odor, sheen/small droplets of fuel. water color = black

5/13/14 A Gelich

- 1207 stop purge. 8 gallons removed from well
- 1210 decon pump. Record water level = same as previous.
- 1230 Move to surveying activity w/ Dylan Hickey. Survey data in separate notebook.
- 1500 End survey. Begin development at 46 MW-14  
DTW = 5.93 ft | 7.22 feet H<sub>2</sub>O  
DT bottom well = 13.15 ft | 1.23 gallons in well  
Development to proceed to 12.3 gallons
- 1505 Begin surge & purge
- 1517 stop purge, remove 13 gallons
- 1530 leave well
- 1535 arrive at well 46 MW-15
- 1543 start purge DTW = 5.31 ft
- 1546 stop purge DT bottom = 9.17 ft
- 1555 decon, leave site 3.86 ft water in well
- 1603 arrive at drum 0.65 gallons in well  
Storage area to dispose of PPE & purge water

AG

Rite in the Rain



A. Geilich  
E. Freitas

5/14/14

1000 - Arrive at well DPB24 and  
set up

- take water level

DTW = 6.57 ft

DT<sub>base</sub> = 11.82 ft

1018 begin purge and begin taking water  
quality parameters w/ YSI

1047 Finish purging & collect sample

~~14-AKREPL-DPB24-GW~~ AG

14-AREPL-DPB24-GW

well purged with peristaltic pump  
due to 1 inch diameter casing

1057 install datalogger - 11.37 ft  
below top of casing

1125 move to well MW8, take water level

1216<sup>pu</sup>

DTW = 43.57 ft

Depth to base = 46.92 ft

sand over-flowing around casing. Appears to  
have gone down well and bottom of well  
felt soft.

1216 - Begin purge with bladder pump  
- collect water quality parameters  
with YSI

A. Geilich  
E. Freitas

5/14/14

1245

Parameter stabilize,

collect sample

MW8-GW  
14-AREPL-DPB24-GW and

1330

off-site, lunch

dup 14-AREPL-MW8-GW

1400

check MW10. Car is on  
top of well and will

need to move to sample.

1410

move to 46MW-12, take  
water level.

DTW = 18.68'

TD = 28.57'

1427

Begin purge with bladder  
pump. collect water  
quality parameters with YSI.

1451

Parameters stable.

collect 14-AREPL-46MW12-GW

1520

clean up site, <sup>2</sup> dup  
move to MW-28

1525

DTW = 8.85'

TD = 11.17'

1548

Begin pumping and  
taking parameters  
using bladder pump  
and - YSI.



A. Geilich  
E. Freitas

5/14/14

1603 Parameters stabilize,  
collect14-AREPL-MW28-GW~~No~~ VOC's - 16031610 collect Dhc sample<sup>8cc</sup>

1620 collect MNA samples

1635 collect CSIA samples

1655 clean up.

1710 off site. move to  
MW-5.1730 DTW = 43.26'  
TD = 50.0'1738 Begin collecting  
parameters with t/SI,  
Purging done with  
bladder pump.

1753 collect sample-Dhc

14-AREPL-MW5-GW

1800 collect MNA samples

1810 collect CSIA samples

1820 collect VOC samples

1840 clean up, site

1845 Dump water purged  
and PPE into drums  
at containment area.A. Geilich  
E. Freitas

5/14/14

1900 Off-site. Head back  
to office to put  
samples in fridge.

5/14/14

E



5/15/14

0830 calibrate VSI

	initial	final
pH		
7	7.13	7.01
4	4.00	4.00
10	10.05	10.06

cond	1.389	1.414
ORP	226.9	240.1
DO	93.2%	100.8%

Finish calibration. Pack up and go to site

1011 set up at well # 46MW-15

1026 start purge at 460 ml/min

1054 stop purge rolling VSI readings, collect sample 14-AREPL-46MW-15-GW for VOC, MNA, CSIA.

1130 decon equipment, charge bladder, move to next well.

1140 talk to printing business about moving truck on top of well MW-10. Will try to move before end of day.

1210 set up at well 46MW-13

1243 begin purging w/ bladder pump  
heavy fuel odor & sheen noted

1310 - collect sample 14-AREPL-46MW-13-GW  
- move to well 46MW-14

- decon pump & other equipment

1400 set up at well 46MW-14

1423 begin purge  
heavy fuel odor & product droplets observed

1448 collect sample 14-AREPL-46MW-14-GW  
decontaminate equipment.  
~4 gallons purge water produced

1520 ask for truck to be moved off well MW-10

1530 set up at MW-10

1550 Begin purge at MW-10 w/ bladder pump

1612 collect sample 14-AREPL-MW-10-GW  
decon equipment

1642 drop off waste & PPE at accumulation area

1701 leave site

AG



L Hess  
S. Fox

7/15/14

1420 On site at 46MW14  
well site in good condition

DTW (TCC) 7.99'

Depth to barologger 2.0'  
Depth to PT 12.89'

PT serial # 0042030206  
Barologger #: 0012030250

1455 Off site, back to office

SA

A Geilich 5/16/14

- Prepare samples for shipment
  - VOC & MNA samples will be shipped to Onsite Environmental
  - CSIA samples ship to Pace/Microseps
  - Gene-Trac DHC samples ship to SIREM
- Onsite & Microseps shipments shipped 5/16. Via AK Air & FedEx respectively.
- SIREM samples shipped 5/19 because of no weekend staff at lab. Via FedEx

Waybill #s

Onsite 027-1096 2814

SIREM

Microseps 8055 8696 2392

1500 return to well 46MW14 to deploy level logger and barologger. Both set at 12.84 ft bgs

AG

Rite in the Rain

A Geilich 5/22/14

1430 - on site at 4th/barbell to  
meet w/ Grant Lidren of ADEC  
& Emerald Alaska to coordinate  
disposal of drums.

1440 - Grant Lidren on site. Grant signs  
disposal paperwork for 1 drum PPE,  
1 drum soil, 2 drums purge water.

1500 Emerald removes drums from site

AG

AG

*Rite in the Rain*



7/22/14 A Geilich

- 1425 on site at Ship Creek RV lot to  
retrieve data logger serial #. at DPB24  
# = 0042016879  
depth when placed on 5/14/14  
was 11.37 ft btoe
- 1435 off site

AG

8/12/14

- 1300 meet Lena at MLTP to  
get GPS coordinates & data logger  
readings. Datalogger at 9.06 ft BTOC
- take water level reading at MW125 = 7.26 ft BTOC
  - download data from logger serial # = 0022029089
  - collect GPS coordinates for MW125 & MW13
- 1335 Leave MLTP
- 1340 - Collect GPS coordinates for AKRR MW-24,  
AKRR MW-25 & AKRR MW-22
- 1405 move to DPB24 DTW = 7.41 ft BTOC  
download data from logger
- 1420 move to 46MW-H DTW = 7.96 ft  
download data from barologger and  
level logger
- 1445 leave site

AG

Return to the Rain.

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PROJECT NAME	WELL CONDITION	NOMINAL DIAMETER	O.D.	I.D.	VOLUME (GAL/LIN FT)
AK Real Estate	good				
CLIENT ADES	DAMAGE PRESENT none	2"	2.375"	2.067"	0.17
DATE 5/14/14	DEPTH TO WATER (FROM TOC) 43.26'	3"	3.5"	3.068"	0.38
SITE MW-5	DEPTH TO BASE (FROM TOC) 50.0'	4"	4.5"	4.026"	0.66
GEOLOGIST Emily Freitas	HEIGHT OF WATER COLUMN 6.74'	6"	6.625"	6.065"	1.50
WEATHER/ TEMPERATURE 65°, sunny	WELL VOLUME 1.1458 gal.	8"	8.625"	7.981"	2.60
WIND light breeze					

## SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW

SAMPLE COLLECTED WITH:      Bailer   X   Pump, Type: bladder      Other, Specify:     

MADE OF:   X   Stainless Steel      PVC  
  X   Teflon      Disposable LDPE      Other, Specify:     

SAMPLING DECON PROCEDURE: Alconox & water

SAMPLE DESCRIPTION: clear, no odor  
(color, free product thickness, odor, turbidity)

## FIELD WATER QUALITY PARAMETERS

[illegible]

## ANALYTICAL SAMPLE INFORMATION

Analyte	Time	Identification	Additional Sample	Time	Identification	Sampling Notes:
VOC	1820	14- AR <del>PL</del> <sup>EP</sup> - MW5-GW	Duplicate			
Dhc	1753	14- AR <del>PL</del> <sup>EP</sup> - MW5-GW				
MNA	1800	14- AR <del>PL</del> <sup>EP</sup> - MW5-GW				
CSIA	1910	14- AR <del>PL</del> <sup>EP</sup> - MW5-GW				
Other						

PROJECT NAME	WELL CONDITION	NOMINAL DIAMETER	O.D.	I.D.	VOLUME (GAL/LIN FT)
Alaska Real Estate	good				
CLIENT APEC	DAMAGE PRESENT <del>OK</del> now	2"	2.375"	2.067"	0.17
DATE 05/13/14	DEPTH TO WATER (FROM TOC) <del>115.0'</del> 114.0'	3"	3.5"	3.068"	0.38
SITE MW-6	DEPTH TO BASE (FROM TOC) 50.2'	4"	4.5"	4.026"	0.66
GEOLOGIST Emily Freitas	HEIGHT OF WATER COLUMN 6.2'	6"	6.625"	6.065"	1.50
WEATHER/TEMPERATURE 60°, sunny	WELL VOLUME 1,554 gallons	8"	8.625"	7.981"	2.60
WIND no wind					

## SAMPLING DATA

SAMPLE TYPE (GW,  
PRODUCT, OTHER): GW

SAMPLE COLLECTED  
WITH:      Bailer X Pump, Type: Bladder      Other, Specify:

MADE OF: X Stainless Steel      PVC  
X Teflon      Disposable LDPE      Other, Specify:

SAMPLING DECON  
PROCEDURE: Alconox + water

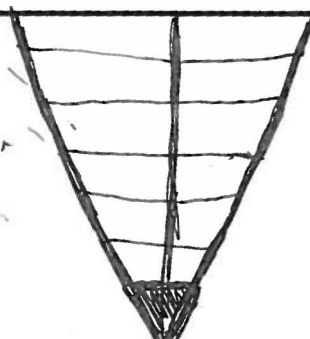
SAMPLE DESCRIPTION: slight odor, clear  
(color, free product  
thickness, odor,  
turbidity)

## FIELD WATER QUALITY PARAMETERS

[illegible]

## ANALYTICAL SAMPLE INFORMATION

Analyte	Time	Identification	Additional Sample	Time	Identification	Sampling Notes:
VOC	1708	14-AKREPL-MW6-GW	Duplicate	1710	14-AKREPL-MW6-GW	
Dhc	1708	14-AKREPL-MW6-GW				
MNA	1708	14-AKREPL-MW6-GW				
CSIA	1708	14-AKREPL-MW6-GW				
Other						





PROJECT NAME	WELL CONDITION	NOMINAL DIAMETER	O.D.	I.D.	VOLUME (GAL/LIN FT)
CLIENT	DAMAGE PRESENT	2"	2.375"	2.067"	0.17
DATE	DEPTH TO WATER (FROM TOC)	3"	3.5"	3.068"	0.38
SITE	DEPTH TO BASE (FROM TOC)	4"	4.5"	4.026"	0.66
GEOLOGIST	HEIGHT OF WATER COLUMN	6"	6.625"	6.065"	1.50
WEATHER/TEMPERATURE	WELL VOLUME	8"	8.625"	7.981"	2.60
WIND					

### SAMPLING DATA

SAMPLE TYPE (GW,  
PRODUCT, OTHER): GW

SAMPLE COLLECTED  
WITH:      Bailer ✓ Pump, Type: GED Bladder      Other, Specify:

MADE OF: ✓ Stainless Steel      PVC  
✓ Teflon Bladder      Disposable LDPE      Other, Specify:

SAMPLING DECON  
PROCEDURE: Alconox + water

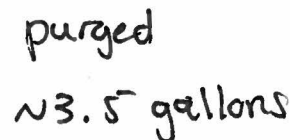
SAMPLE DESCRIPTION:  
(color, free product  
thickness, odor,  
turbidity) slightly turbid, no odor. Water became clear during purging

## FIELD WATER QUALITY PARAMETERS

[illegible]

## ANALYTICAL SAMPLE INFORMATION

Analyte	Time	Identification	Additional Sample	Time	Identification	Sampling Notes:
VOC	1045	14-AKREPL-MWD7-GW	Duplicate			
Dhc						
MNA						
CSIA						
Other						



9



PROJECT NAME	WELL CONDITION	NOMINAL DIAMETER	O.D.	I.D.	VOLUME (GAL/LIN FT)
AK Real Estate	Good	2"	2.375"	2.067"	0.17
CLIENT	DAMAGE PRESENT	3"	3.5"	3.068"	0.38
AES	NO	4"	4.5"	4.026"	0.66
DATE	DEPTH TO WATER (FROM TOC)	6"	6.625"	6.065"	1.50
5/15/14	43.6 42.88	8"	8.625"	7.981"	2.60
SITE	DEPTH TO BASE (FROM TOC)				
4th / Campbell	49.85 48.50				
GEOLOGIST	HEIGHT OF WATER COLUMN				
A Geilich S Fox	5.62 ft				
WEATHER/TEMPERATURE	WELL VOLUME				
65 Sunny	0.96 gal				
WIND					
light					

## SAMPLING DATA

SAMPLE TYPE (GW,  
PRODUCT, OTHER): GW

SAMPLE COLLECTED  
WITH:      Bailer X Pump, Type: Bladder      Other, Specify:

MADE OF: X Stainless Steel      PVC  
X Teflon      Disposable LDPE      Other, Specify:

SAMPLING DECON  
PROCEDURE: alcoex + water, rinse

SAMPLE DESCRIPTION:  
(color, free product  
thickness, odor,  
turbidity)

## FIELD WATER QUALITY PARAMETERS

[illegible]

## ANALYTICAL SAMPLE INFORMATION

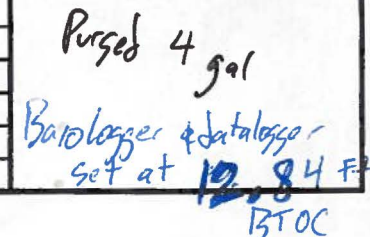
Analyte	Time	Identification	Additional Sample	Time	Identification	Sampling Notes:
VOC	1612	14-AREPL-MN-10-GW	Duplicate			
Dhc						
MNA	1612	same as above				
CSIA						
Other						

42













# GROUNDWATER SAMPLING FORM

PROJECT  
NUMBER:  
20266.008.01

WELL NUMBER:  
46 MW-15

SHEET:  
1 of 1

PROJECT NAME AK Real Estate  
CLIENT AES  
DATE 5/15/14  
SITE 4th/Cambell  
GEOLOGIST Agelich S Fox  
WEATHER/  
TEMPERATURE Sunny 60°F  
WIND NO

WELL CONDITION good  
DAMAGE PRESENT no  
DEPTH TO WATER  
(FROM TOC) 5.20 ft  
DEPTH TO BASE  
(FROM TOC) 9.10 ft  
HEIGHT OF WATER  
COLUMN 3.90 ft  
WELL VOLUME 0.66 gal

NOMINAL DIAMETER	O.D.	I.D.	VOLUME (GAL/LIN FT)
2"	2.375"	2.067"	0.17
3"	3.5"	3.068"	0.38
4"	4.5"	4.026"	0.66
6"	6.625"	6.065"	1.50
8"	8.625"	7.981"	2.60

## SAMPLING DATA

SAMPLE TYPE (GW,  
PRODUCT, OTHER):

GW

SAMPLE COLLECTED  
WITH:

☐ Bailer

☒ Pump, Type: Bladder

☐ Other, Specify:

MADE OF:

☒ Stainless Steel

☐ PVC

☒ Teflon

☐ Disposable LDPE

☐ Other, Specify:

SAMPLING DECON  
PROCEDURE:

alanox + DI water rinse

SAMPLE DESCRIPTION:  
(color, free product  
thickness, odor,  
turbidity)

## FIELD WATER QUALITY PARAMETERS

Time	Flow Rate (mL/min)	Water Level	Draw Down	Temperature (°C)	Spec. Cond. (µS/cm)°	D.O. (%)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Color	Odor
1029	460	5.25	0.05	6.61	0.802	7.5	0.92	6.40	-31.4	617	gray	rel
1034	460	5.25	0.05	6.64	0.799	9.6	1.16	5.96	-7.2	91.0		
1039	460	5.25	0.05	6.09	0.799	8.9	1.12	6.13	-16.1	31.0		
1044	460	5.25	0.05	6.05	0.798	7.5	0.92	6.28	-23.2	18.1		
1049	460	5.25	0.05	6.09	0.796	8.3	1.02	6.35	-21.5	16.7		
1054	460	5.25	0.05	6.10	0.796	7.4	0.86	6.36	-20.3	12.2		

## ANALYTICAL SAMPLE INFORMATION

Analyte	Time	Identification	Additional Sample	Time	Identification	Sampling Notes:
VOC	1054	14-AREPL-46MW-15-GW	Duplicate			purged approx 4 gallons
Dhc						
MNA	1054	same as above				
CSIA	1054	same as above				
Other						







# GROUNDWATER SAMPLING FORM

PROJECT NUMBER:  
20260008

WELL NUMBER:  
MW-125

SHEET:  
1 of 1

PROJECT NAME: Alaska Real Estate  
CLIENT: ADEC  
DATE: 5/13/14  
SITE: MW-125  
GEOLOGIST: Emily Freitas  
WEATHER/TEMPERATURE: 52° sunny  
WIND: light breeze

WELL CONDITION: good  
DAMAGE PRESENT: none  
DEPTH TO WATER (FROM TOC): 6.3 ft.  
DEPTH TO BASE (FROM TOC): 9.35 ft.  
HEIGHT OF WATER COLUMN: 3.05 ft.  
WELL VOLUME: 15185 gal

NOMINAL DIAMETER	O.D.	I.D.	VOLUME (GAL/LIN FT)
2"	2.375"	2.067"	0.17
3"	3.5"	3.068"	0.38
4"	4.5"	4.026"	0.66
6"	6.625"	6.065"	1.50
8"	8.625"	7.981"	2.60

## SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW

SAMPLE COLLECTED WITH: Bailer ☒ Pump, Type: Bladder ☐ Other, Specify: \_\_\_\_\_

MADE OF: ☒ Stainless Steel ☐ PVC ☒ Teflon ☐ Disposable LDPE ☐ Other, Specify: \_\_\_\_\_

SAMPLING DECON PROCEDURE: Alconox + water

SAMPLE DESCRIPTION: clear with an odor present  
(color, free product thickness, odor, turbidity)

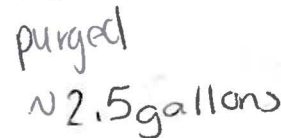
## FIELD WATER QUALITY PARAMETERS

Time	Flow Rate (mL/min)	Water Level (ft)	Draw Down	Temperature (°C) ± 0.2	Spec. Cond. (µS/cm) ± 3%	D.O. (%) ± 0.1	D.O. (mg/L) ± 0.1	pH ± 0.1	ORP (mV)	Turbidity (NTU)	Color	Odor
1324	300	6.35	0.2	7.05	207	33.3	4.01	6.31	86.9	55.1	Red	None
1330	300	6.45	0.15	5.47	202	30.8	4.01	5.9	86.3	19.4	Red	None
1335	300	6.5	0.2	4.99	206	26.9	2.65	5.92	67.4	57.1	clear	yes
1340	↓	6.5	↓	4.76	207	26.7	3.39	6.06	55.7	23.3	clear	yes
1345	↓	6.5	↓	4.77	207	19.3	2.44	6.21	43.2	11.9	clear	yes
1350	↓	6.5	↓	4.80	208	18.2	2.31	6.29	37.6	11.9	clear	yes
1400		6.3										

## ANALYTICAL SAMPLE INFORMATION

Analyte	Time	Identification	Additional Sample	Time	Identification
VOC	1350	14-AKREPL-MW125-GW	Duplicate		
Dhc					
MNA					
CSIA					
Other					

Sampling Notes: small leak in 4SI, DO unlikely to stabilize  
purged ~2.5 gallons





purged  
~2.5 gal

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Project File: M:\AES\PROJECT FILES - REORGANIZED\ADEC TOS\20266.008\_AK\_REAL\_ESTATE\10\_FIELD REPORTS\GINT\PROJECT.GPJ Library: M:\AES\PROJECT FILES - REORGANIZED\ADEC TOS\20266.008\_AK\_REAL\_ESTATE\10\_FIELD REPORTS\GINT\AES DATA TEMP



# SOIL BORING AND WELL CONSTRUCTION LOG

Boring Number: 4GMW-12  
Project Number: 20266.008  
X/Y Coordinates 1663885.1/2637984.8  
X/Y Datum NAD83(2011) ASP4 USft  
Ground Elevation 85.94  
Elevation Datum NAVD88 ft  
Extra Field Notes:

Project Name Alaska Real Estate  
Site Alaska Real Estate Parking Lot  
Client ADEC  
Field Scientist/Engineer Olga Stewart  
Date 5/8/2014  
Weather Sunny  
Total Depth 30 feet bgs  
Boring Size 4.5 -inch  
Recovery Device DT 45  
Device Diameter 4.5 -inch  
Sample Method DT 45  
# of Samples 0  
Drilling Company GeoTek Alaska  
Rig Type Geoprobe 8040  
Hammer Drop & Weight N/A  
Associated Points N/A

COLORTEC READING (ppm)	SOIL DESCRIPTION AND NOTES	SOIL GRAPHIC	DEPTH (ft)	WATER LEVEL	WELL GRAPHIC	WELL DESCRIPTION
	No soil recovered.		0			Flush mount monument encased in 6" of concrete.
			5			
			10			
			15			Bentonite seal from 4.5-22 ft bgs.
0	SAND (SP); brown; dense; damp; silt observed at 17.5'-20'. Silt with organics observed from 18.5'-20' bgs.		20			
0	SAND (SP); brown; dense; wet; transition to fine grained sand at 23' bgs.		25			
0	SAND (SP); black; dense; wet; gray clay observed in recovered macrocore at 30' bgs.		30			Pre-packed 20/40 silica sand screened interval 24-29 ft bgs.

End of Boring: 30 feet bgs.

Project File: M:\AES\PROJECT FILES - REORGANIZED\ADEC TOS\20266.008\_AK\_REAL\_ESTATE\10\_FIELD REPORTS\GINT\PROJECT.GPJ Library: M:\AES\PROJECT FILES - REORGANIZED\ADEC TOS\20266.008\_AK\_REAL\_ESTATE\10\_FIELD REPORTS\GINT\AES DATA TEMP



# SOIL BORING AND WELL CONSTRUCTION LOG

Boring Number: 4GMW-13  
Project Number: 20266.008

Project Name	Alaska Real Estate	Recovery Device	DT 45	X/Y Coordinates	1663924/2638387
Site	Alaska Real Estate Parking Lot	Device Diameter	4.5 -inch	X/Y Datum	NAD83(2011) ASP4 USft
Client	ADEC	Sample Method	DT 45	Ground Elevation	43.39
Field Scientist/Engineer	Olga Stewart	# of Samples	0	Elevation Datum	NAVD88 ft
Date	5/8/2014	Drilling Company	GeoTek Alaska	Extra Field Notes:	
Weather	Sunny	Rig Type	Geoprobe 8040		
Total Depth	20 feet bgs	Hammer Drop & Weight	N/A		
Boring Size	4.5 -inch	Associated Points	N/A		

COLORTEC READING (ppm)	SOIL DESCRIPTION AND NOTES	SOIL GRAPHIC	DEPTH (ft)	WATER LEVEL	WELL GRAPHIC	WELL DESCRIPTION
	No soil recovered.		0			Flush mount monument encased in 6" of concrete.
			5			Bentonite seal from 2-6 ft bgs.
0	SANDY GRAVEL (GP); gray; dense; damp; strong fuel odor.		10			Pre-packed 20/40 silica sand screened interval from 8.5-13.5 ft bgs.
0			15			
0	CLAY (CH); gray; stiff; moist; first colortec screening sample at 16' was 3 ppm but the result was not reproducible.		20			

End of Boring: 20 feet bgs.





# SOIL BORING AND WELL CONSTRUCTION LOG

Boring Number: 4GMW-14  
Project Number: 20266.008  
X/Y Coordinates 1663780/2638479  
X/Y Datum NAD83(2011) ASP4 USft  
Ground Elevation 40.23  
Elevation Datum NAVD88 ft  
Extra Field Notes:

Project Name Alaska Real Estate  
Site Alaska Real Estate Parking Lot  
Client ADEC  
Field Scientist/Engineer Olga Stewart  
Date 5/8/2014  
Weather Sunny  
Total Depth 15 feet bgs  
Boring Size 4.5 -inch  
Recovery Device DT 45  
Device Diameter 4.5 -inch  
Sample Method DT 45  
# of Samples 0  
Drilling Company GeoTek Alaska  
Rig Type Geoprobe 8040  
Hammer Drop & Weight N/A  
Associated Points N/A

COLORTEC READING (ppm)	SOIL DESCRIPTION AND NOTES	SOIL GRAPHIC	DEPTH (ft)	WATER LEVEL	WELL GRAPHIC	WELL DESCRIPTION
			0			Flush mount monument encased in 6" of concrete
			5			Bentonite seal from 2-5.5 ft bgs.
0	Unable to remove sample sleeve from core barrel. Note strong fuel odor with noticeable black fuel product.		10			
0.5	GRAVEL (GP); dark black; dense; moist; strong fuel odor; hydrocarbon staining; fuel product noted throughout recovered sample					Pre-packed 20/40 silica sand screened interval from 8.5-13.5 ft bgs.
0	blebs of NAPL noted in recovered sample.					
0	CLAY (CH); gray; stiff; moist.		15			

End of Boring: 15 feet bgs.



SOIL BORING AND WELL CONSTRUCTION LOG

Boring Number: 4GMW-15  
Project Number: 20266.008  
X/Y Coordinates 1663501/2638691  
X/Y Datum NAD83(2011) ASP4 USft  
Ground Elevation 37.06  
Elevation Datum NAVD88 ft  
Extra Field Notes:

Project Name Alaska Real Estate  
Site Alaska Real Estate Parking Lot  
Client ADEC  
Field Scientist/Engineer Olga Stewart  
Date 5/7/2014  
Weather Partly Cloudy  
Total Depth 15 feet bgs  
Boring Size 4.5 -inch  
Recovery Device DT 45  
Device Diameter 4.5 -inch  
Sample Method DT 45  
# of Samples 0  
Drilling Company GeoTek Alaska  
Rig Type Geoprobe 8040  
Hammer Drop & Weight N/A  
Associated Points N/A

COLORTEC READING (ppm)	SOIL DESCRIPTION AND NOTES	SOIL GRAPHIC	DEPTH (ft)	WATER LEVEL	WELL GRAPHIC	WELL DESCRIPTION
	No soil recovered.		0			Flush mount monument encased in 6" of concrete
0	GRAVEL WITH SAND (GP); gray; dense; moist; strong fuel odor; hydrocarbon staining.		5			Bentonite seal from 0.8-2 ft bgs.
0			10			Pre-packed 20/40 silica sand screened interval from 4.5-9.5 ft bgs.
1	CLAY (CH); gray; stiff; moist; no odor.					
0			15			

End of Boring: 15 feet bgs.

## **APPENDIX C**

### **PHOTOGRAPH LOG**

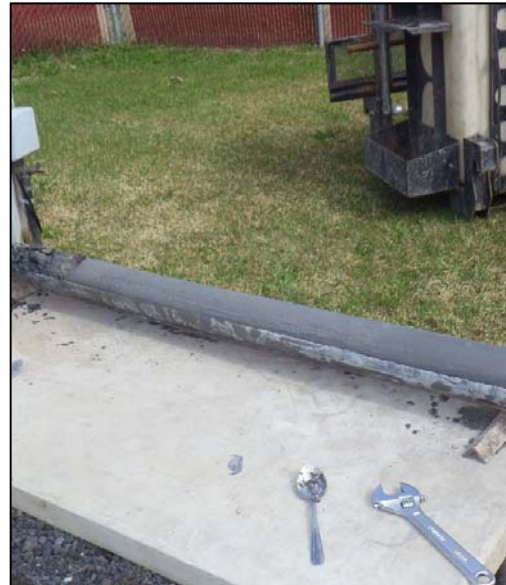
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Photograph 1: Drilling monitoring well 4GMW-15 at the Ship Creek RV Lot using a GeoProbe 8040 direct push drilling rig. Looking east.

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Photograph 2: Soils encountered during installation of well 4GMW-15 – sandy gravel to sand, to Bootlegger clay. Collecting soil for ColorTec screening.

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Photograph 3: Drilling monitoring well 4GMW-12 near Grubstake Auction lot using a GeoProbe 8040 direct push drilling rig. Looking southeast.

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Photograph 4: Soils encountered during installation of well 4GMW-12. Well sorted medium-grained sands to Bootlegger clay.

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Photograph 5: Drilling monitoring well 4GMW-13 near former PENCO well MW-1.  
Looking west.

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Photograph 6: Soils encountered during installation of well 4GMW-13. Sandy gravel  
with petroleum impacts to Bootlegger clay.

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Photograph 7: Drilling monitoring well 4GMW-14. Looking northwest.

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Photograph 8: Soils encountered during installation of well 4GMW-14. Sandy gravel impacted with petroleum.

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Photograph 9: Pool of water located behind former Alaska Native Hospital fencing located just south of monitoring well 4GMW-14. Looking south.

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Photograph 10: Condition of MW-3 prior to decommissioning.

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Photograph 11: Decommissioning MW-3. Looking west.

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Photograph 12: Monitoring well MW-1 prior to decommissioning.

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Photograph 13: Decommissioning MW-1. Looking southeast.

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Photograph 14: MW-4 condition prior to decommissioning.

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Photograph 15: Decommissioning MW-4. Looking southeast.

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Photograph 16: MW-2 prior to decommissioning.

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Photograph 17: Decommissioning MW-2. Looking west.

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## **APPENDIX D**

### **WASTE DISPOSAL DOCUMENTS**



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ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
DIVISION OF SPILL PREVENTION AND RESPONSE  
Contaminated Sites Program

**Contaminated Soil Transport and Treatment Approval Form**

<b>DEC HAZARD ID #</b>		<b>NAME OF CONTAMINATED SITE</b>	
4084		Alaska Real Estate Parking Lot	
<b>SPILL LOCATION</b>			
Former dry cleaner at 717 E. Fourth Avenue, Anchorage, AK 99501			
<b>CONTAMINATED SOIL'S CURRENT LOCATION</b>		<b>SOURCE OF THE CONTAMINATION</b>	
In a fenced area at the site		Unknown - may be related to fuel spills?	
<b>TYPE OF CONTAMINATION</b>	<b>ESTIMATED VOLUME</b>	<b>DATE(S) STOCKPILE GENERATED</b>	
Petroleum	20 gallons	May 7-8, 2014	
<b>POST TREATMENT ANALYSIS REQUIRED: (such as GRO, DRO, RRO, BTEX, and/or Chlorinated Solvents)</b>			
None			
<b>COMMENTS</b>			
Soil cuttings generated from drilling downgradient of the AK Real Estate Parking Lot site. One soil sample collected from the drum and analyzed for DRO, GRO, and VOCs showed GRO at 150 mg/kg and DRO at 6,100 mg/kg. Only 5 VOCs were detected; all were below the most stringent ADEC cleanup level. The cuttings were placed in a 55-gallon drum after drilling pending results for disposal. Since results are petroleum and not related to dry cleaning, the source of contamination is unknown.			

**Facility Accepting the Contaminated Soil**

<b>NAME OF THE FACILITY</b>	<b>ADDRESS/PHONE NUMBER</b>
Emerald Alaska, Inc.	800 E. Ship Creek Ave, Anchorage, AK 99501 / 907-646-5020

**Responsible Party and Contractor Information**

<b>BUSINESS/NAME</b>	<b>ADDRESS/PHONE NUMBER</b>
ADEC / Grant Lidren	555 Cordova Street, Anchorage, AK 99501 / 907-269-8685

Olga Stewart

Name of the Person Requesting Approval (printed)

*Olga M. Stewart*  
Signature

Project Manager / Ahtna Engineering Services, LLC

Title/Association

5/21/14

Date

907-865-3865

Phone Number

**-----DEC USE ONLY-----**

Based on the information provided, ADEC approves transport of the above mentioned material for treatment in accordance with the approved facility operations plan. The Responsible Party or their consultant must submit to the DEC Project Manager a copy of weight receipts of the loads transported to the facility and a post treatment analytical report. The contaminated soil shall be transported as a covered load in compliance with 18 AAC 60.015.

*Grant Lidren*

DEC Project Manager Name (printed)

*Grant Lidren*  
Signature

*EPS ADEC CS*

Project Manager Title

*5/21/14*  
Date

*269-8685*  
Phone Number

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# NON-HAZARDOUS WASTE MANIFEST

JUN 13 2014

Please print or type (Form designed for use on elite (12 pitch) typewriter)

<b>NON-HAZARDOUS WASTE MANIFEST</b>		1. Generator's US EPA ID No. AKR000201574		Manifest Document No. 22031A		2. Page 1 of 1	
3. Generator Name and Mailing Address 110 W. 38TH AVE, SUITE 200A ANCHORAGE, AK 99503 4. Generator's Phone (907) 297-8039		Site Address ADEC 4TH AVE & GAMBELL PROPERTY ANCHORAGE, AK 99501		OLGA STEWART			
5. Transporter 1 Company Name EMERALD ALASKA, INC		6. US EPA ID Number AKR000004184		A. State Transporter's ID			
7. Transporter 2 Company Name		8. US EPA ID Number		B. Transporter 1 Phone (907) 258-1558			
9. Designated Facility Name and Site Address EMERALD ALASKA, INC. 2020 VIKING DRIVE ANCHORAGE, AK 99501		10. US EPA ID Number AKR000004184		C. State Transporter's ID			
				D. Transporter 2 Phone			
				E. State Facility's ID			
				F. Facility's Phone (907) 258-1558			
11. WASTE DESCRIPTION				Containers No. Type		13. Total Quantity	
a. MATERIAL NOT REGULATED BY D.O.T.				1 1 DM		200	
b.							
c.							
d.							
G. Additional Descriptions for Materials Listed Above 1)EA0708 ADEC REPORTABLE POL SOIL				H. Handling Codes for Wastes Listed Above			
15. Shipper's Certification: This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.							
16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.							
Printed/Typed Name Grant Lichten				Signature <i>[Signature]</i>		Date Month Day Year 5/22/14	
17. Transporter 1 Acknowledgement of Receipt of Materials				Signature <i>[Signature]</i>		Date Month Day Year 5/22/14	
18. Transporter 2 Acknowledgement of Receipt of Materials				Signature		Date Month Day Year	
19. Discrepancy Indication Space							
20. Facility Owner or Operator: Certification of receipt of the waste materials covered by this manifest, except as noted in item 19.				Signature <i>[Signature]</i>		Date Month Day Year 05/23/14	

NON-HAZARDOUS WASTE

GENERATOR

TRANSPORTER

FACILITY





# CERTIFICATE OF DISPOSAL/RECYCLE

RECEIVED

JUN 13 2014

IN OPERATIONS

**GENERATOR:** ADEC  
4TH AVE & GAMBELL PROPERTY  
ANCHORAGE AK 99501

**DISPOSAL FACILITY:** EMERALD ALASKA, INC.  
2020 VIKING DRIVE  
ANCHORAGE AK 99501

**EPA ID NUMBER:** AKR000201574

**MANIFEST/DOCUMENT #:** 22031A

**DATE OF DISPOSAL/RECYCLE:** 05/22/2014

<u>LINE</u>	<u>WASTE DESCRIPTION</u>	<u>CONTAINERS</u>	<u>TYPE</u>	<u>QUANTITY</u>	<u>UOM</u>
1	ADEC REPORTABLE POL SOIL	1	DM	200	P

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above described waste was managed in compliance with all applicable laws, regulations, permits, and licenses on the date listed above.

**PREPARED BY:** PATRICIA BEASLEY

**SIGNATURE:**

*Patricia S. Beasley*

**DATE:** 5/23/2014

*Your Local Partner for Recycling Environmental Services*

425 Outer Springer Loop Road - Palmer, AK 99645 - (907) 258-1558 - Fax (907) 746-3651 - Toll Free (877) 375-504

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

004899989 FLE

Contract# 7619

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS  
WASTE MANIFEST

1. Generator ID Number

AKR000201574

2. Page 1 of 3

3. Emergency Response Phone

1-800-424-9300

4. Manifest Tracking Number

004899989 FLE

5. Generator's Name and Mailing Address

ADEC  
110 W. 38TH AVE, SUITE 200A  
ANCHORAGE, AK 99503  
Generator's Phone: (907) 297-8039

Generator's Site Address (if different than mailing address)

ADEC  
4TH AVE & GAMBELL PROPERTY  
ANCHORAGE, AK 99501

6. Transporter 1 Company Name

EMERALD ALASKA, INC

U.S. EPA ID Number

AKR000004184

7. Transporter 2 Company Name

WEAVER BROTHERS

U.S. EPA ID Number

AKD002848372

8. Designated Facility Name and Site Address

US ECOLOGY IDAHO, INC.  
20400 LEMLEY RD  
GRAND VIEW, ID 83624  
Facility's Phone: (800) 274-1516

U.S. EPA ID Number

IDD073114654

9a.  
HM

9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))

10. Containers

No.

Type

11. Total  
Quantity12. Unit  
Wt./Vol.

13. Waste Codes

1. X RQ, UN3082, WASTE ENVIRONMENTALLY HAZARDOUS  
SUBSTANCES, LIQUID, N.O.S. (TETRACHLOROETHENE),  
2. PGIII, RQ=F002, ERG#171

2

DM

800

P

F002

2. X RQ, UN3077, Waste environmentally hazardous  
substances, solid, n.o.s. (PERCHLOROETHYLENE),  
3. PGIII, RQ=100, ERG#171

1

DM

100

P

F002

14. Special Handling Instructions and Additional Information

1)USE25178 F002 PURGE WATER 55DM  
2)26608 PCE CONTAMINATED WOOD/DEBR

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.  
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Officer's Printed/Typed Name

Signature

Month Day Year

Grant Lien

Grant Lien

5 22 14

16. International Shipments

☐

Import to U.S.

☐

Export from U.S.

Port of entry/exit:

Date leaving U.S.:

Transporter signature (for exports only):

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name

Signature

Month Day Year

Morgan Kuhnke

Morgan Kuhnke

5 22 14

Transporter 2 Printed/Typed Name

Signature

Month Day Year

Roger Vaarhis

Roger Vaarhis

5 22 14

18. Discrepancy

18a. Discrepancy Indication Space

☐

Quantity

☐

Type

☐

Residue

☐

Partial Rejection

☐

Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator)

U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator)

Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1. H132

2. H132

3.

4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name

Signature

Month Day Year

Jenny Lyons

Jenny Lyons

6 18 14

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)



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## **APPENDIX E**

### **LABORATORY DATA AND DATA REVIEW**

#### **E-1    LABORATORY REPORTS**

- ON-SITE ENVIRONMENTAL
- SIREM
- PACE ANALYTICAL (FORMERLY MICROSEEPS)
- TESTAMERICA

#### **E-2    DATA REVIEW CHECKLISTS**

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14648 NE 95<sup>th</sup> Street, Redmond, WA 98052 • (425) 883-3881

June 2, 2014

Olga Stewart  
Ahtna Engineering Services LLC  
305 34<sup>th</sup> Avenue  
Fairbanks, AK 99701

Re: Analytical Data for Project 20266.008.01.02  
Laboratory Reference No. 1405-144

Dear Olga:

Enclosed are the analytical results and associated quality control data for samples submitted on May 17, 2014.

CS Laboratory Approval Number: UST-039

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "DeB" followed by a stylized flourish.

David Baumeister  
Project Manager

Enclosures



Date of Report: June 2, 2014  
Samples Submitted: May 17, 2014  
Laboratory Reference: 1405-144  
Project: 20266.008.01.02

### **Case Narrative**

Samples were collected on May 13, 14, and 15, 2014 and received by the laboratory on May 17, 2014. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

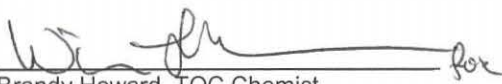
#### Dissolved Iron by EPA 6010C Analysis

The dissolved field filter samples were received containing solid material. The samples were digested according to OnSite Environmental standard operating procedure.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: May 28, 2014  
Samples Submitted: May 17, 2014  
Laboratory Reference: 1405-144  
Project: 20266.008.01.02

**Analyst's Signature**

  
Brandy Howard, TOC Chemist

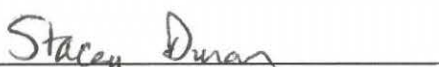
5-28-14  
Date

**Analyst's Signature**

  
William Kelsch, Inorganics Supervisor

5-29-14  
Date

**Analyst's Signature**

  
Stacey Duran, GC/MS Volatiles Chemist

5-29-14  
Date

Date of Report: June 2, 2014  
 Samples Submitted: May 17, 2014  
 Laboratory Reference: 1405-144  
 Project: 20266.008.01.02

**TOTAL ORGANIC CARBON  
 SM 5310B**

Matrix: Water  
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID:</b>	<b>14-AREPL-MW10-GW</b>					
Laboratory ID:	05-144-01					
Total Organic Carbon	<b>1.8</b>	1.0	SM 5310B	5-21-14	5-21-14	

<b>Client ID:</b>	<b>14-AREPL-MW5-GW</b>					
Laboratory ID:	05-144-03					
Total Organic Carbon	<b>1.7</b>	1.0	SM 5310B	5-21-14	5-21-14	

<b>Client ID:</b>	<b>14-AREPL-MW6-GW</b>					
Laboratory ID:	05-144-04					
Total Organic Carbon	<b>1.6</b>	1.0	SM 5310B	5-21-14	5-21-14	

<b>Client ID:</b>	<b>14-AREPL-MW28-GW</b>					
Laboratory ID:	05-144-05					
Total Organic Carbon	<b>3.1</b>	1.0	SM 5310B	5-21-14	5-21-14	

<b>Client ID:</b>	<b>14-AREPL-4GMW-15-GW</b>					
Laboratory ID:	05-144-13					
Total Organic Carbon	<b>3.1</b>	1.0	SM 5310B	5-21-14	5-21-14	

Date of Report: June 2, 2014  
 Samples Submitted: May 17, 2014  
 Laboratory Reference: 1405-144  
 Project: 20266.008.01.02

**TOTAL ORGANIC CARBON  
 SM 5310B  
 QUALITY CONTROL**

Matrix: Water  
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>METHOD BLANK</b>						
Laboratory ID:	MB0521W1					
Total Organic Carbon	<b>ND</b>	1.0	SM 5310B	5-21-14	5-21-14	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
<b>DUPLICATE</b>								
Laboratory ID:	05-138-01							
	ORIG	DUP						
Total Organic Carbon	<b>ND</b>	<b>ND</b>	NA	NA	NA	NA	15	

**MATRIX SPIKE**

Laboratory ID:	05-138-01							
	MS	MS		MS				
Total Organic Carbon	<b>10.5</b>	10.0	ND	105	70-124	NA	NA	

**SPIKE BLANK**

Laboratory ID:	SB0521W1							
	SB	SB		SB				
Total Organic Carbon	<b>10.4</b>	10.0	NA	104	91-119	NA	NA	



Date of Report: June 2, 2014  
 Samples Submitted: May 17, 2014  
 Laboratory Reference: 1405-144  
 Project: 20266.008.01.02

**NITRATE + NITRITE (as Nitrogen)**  
**EPA 353.2**

Matrix: Water  
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID:</b>	<b>14-AREPL-MW10-GW</b>					
Laboratory ID:	05-144-01					
Nitrate+Nitrite	<b>4.7</b>	0.050	EPA 353.2	5-27-14	5-27-14	

<b>Client ID:</b>	<b>14-AREPL-MW5-GW</b>					
Laboratory ID:	05-144-03					
Nitrate+Nitrite	<b>5.5</b>	0.10	EPA 353.2	5-27-14	5-27-14	

<b>Client ID:</b>	<b>14-AREPL-MW6-GW</b>					
Laboratory ID:	05-144-04					
Nitrate+Nitrite	<b>4.9</b>	0.10	EPA 353.2	5-27-14	5-27-14	

<b>Client ID:</b>	<b>14-AREPL-MW28-GW</b>					
Laboratory ID:	05-144-05					
Nitrate+Nitrite	<b>0.16</b>	0.050	EPA 353.2	5-27-14	5-27-14	

<b>Client ID:</b>	<b>14-AREPL-4GMW-15-GW</b>					
Laboratory ID:	05-144-13					
Nitrate+Nitrite	<b>ND</b>	0.050	EPA 353.2	5-27-14	5-27-14	

Date of Report: June 2, 2014  
 Samples Submitted: May 17, 2014  
 Laboratory Reference: 1405-144  
 Project: 20266.008.01.02

**NITRATE + NITRITE (as Nitrogen)**  
**EPA 353.2**  
**QUALITY CONTROL**

Matrix: Water  
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>METHOD BLANK</b>						
Laboratory ID:	MB0527W1					
Nitrate+Nitrite	<b>ND</b>	0.050	EPA 353.2	5-27-14	5-27-14	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
<b>DUPLICATE</b>								
Laboratory ID:	05-144-05							
	ORIG	DUP						
Nitrate+Nitrite	<b>0.155</b>	<b>0.156</b>	NA	NA	NA	NA	1	16

**MATRIX SPIKE**

Laboratory ID:	05-144-05							
	MS	MS		MS				
Nitrate+Nitrite	<b>2.36</b>	2.00	0.155	110	84-119	NA	NA	

**SPIKE BLANK**

Laboratory ID:	SB0527W1							
	SB	SB		SB				
Nitrate+Nitrite	<b>2.20</b>	2.00	NA	110	86-114	NA	NA	

Date of Report: June 2, 2014  
 Samples Submitted: May 17, 2014  
 Laboratory Reference: 1405-144  
 Project: 20266.008.01.02

**SULFATE**  
**ASTM D516-07**

Matrix: Water  
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID:</b>	<b>14-AREPL-MW10-GW</b>					
Laboratory ID:	05-144-01					
Sulfate	<b>29</b>	25	ASTM D516-07	5-27-14	5-27-14	

<b>Client ID:</b>	<b>14-AREPL-MW5-GW</b>					
Laboratory ID:	05-144-03					
Sulfate	<b>40</b>	25	ASTM D516-07	5-27-14	5-27-14	

<b>Client ID:</b>	<b>14-AREPL-MW6-GW</b>					
Laboratory ID:	05-144-04					
Sulfate	<b>42</b>	25	ASTM D516-07	5-27-14	5-27-14	

<b>Client ID:</b>	<b>14-AREPL-MW28-GW</b>					
Laboratory ID:	05-144-05					
Sulfate	<b>46</b>	10	ASTM D516-07	5-27-14	5-27-14	

<b>Client ID:</b>	<b>14-AREPL-4GMW-15-GW</b>					
Laboratory ID:	05-144-13					
Sulfate	<b>ND</b>	5.0	ASTM D516-07	5-27-14	5-27-14	

Date of Report: June 2, 2014  
 Samples Submitted: May 17, 2014  
 Laboratory Reference: 1405-144  
 Project: 20266.008.01.02

**SULFATE  
 ASTM D516-07  
 QUALITY CONTROL**

Matrix: Water

Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>METHOD BLANK</b>						
Laboratory ID:	MB0527W1					
Sulfate	<b>ND</b>	5.0	ASTM D516-07	5-27-14	5-27-14	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
<b>DUPLICATE</b>								
Laboratory ID:	05-144-04							
	ORIG	DUP						
Sulfate	<b>41.9</b>	<b>41.1</b>	NA	NA	NA	2	10	

**MATRIX SPIKE**

Laboratory ID:	05-144-04							
	MS	MS		MS				
Sulfate	<b>95.8</b>	50.0	41.9	108	82-123	NA	NA	

**SPIKE BLANK**

Laboratory ID:	SB0527W1							
	SB	SB		SB				
Sulfate	<b>9.58</b>	10.0	NA	96	91-114	NA	NA	



Date of Report: June 2, 2014  
 Samples Submitted: May 17, 2014  
 Laboratory Reference: 1405-144  
 Project: 20266.008.01.02

**TOTAL IRON  
EPA 6010C**

Matrix: Water  
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
<hr/>						
Lab ID:	05-144-01					
Client ID:	14-AREPL-MW10-GW					
Iron	11000	56	6010C	5-27-14	5-27-14	
<hr/>						
Lab ID:	05-144-03					
Client ID:	14-AREPL-MW5-GW					
Iron	8700	56	6010C	5-27-14	5-27-14	
<hr/>						
Lab ID:	05-144-04					
Client ID:	14-AREPL-MW6-GW					
Iron	1100	56	6010C	5-27-14	5-27-14	
<hr/>						
Lab ID:	05-144-05					
Client ID:	14-AREPL-MW28-GW					
Iron	170	56	6010C	5-27-14	5-27-14	
<hr/>						
Lab ID:	05-144-13					
Client ID:	14-AREPL-4GMW-15-GW					
Iron	16000	56	6010C	5-27-14	5-27-14	
<hr/>						

Date of Report: June 2, 2014  
Samples Submitted: May 17, 2014  
Laboratory Reference: 1405-144  
Project: 20266.008.01.02

**TOTAL IRON  
EPA 6010C  
METHOD BLANK QUALITY CONTROL**

Date Extracted: 5-27-14  
Date Analyzed: 5-27-14  
  
Matrix: Water  
Units: ug/L (ppb)  
  
Lab ID: MB0527WM1

Analyte	Method	Result	PQL
Iron	6010C	<b>ND</b>	56

Date of Report: June 2, 2014  
Samples Submitted: May 17, 2014  
Laboratory Reference: 1405-144  
Project: 20266.008.01.02

**TOTAL IRON  
EPA 6010C  
DUPLICATE QUALITY CONTROL**

Date Extracted: 5-27-14

Date Analyzed: 5-27-14

Matrix: Water

Units: ug/L (ppb)

Lab ID: 05-144-04

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Iron	<b>1120</b>	<b>930</b>	19	56	

Date of Report: June 2, 2014  
Samples Submitted: May 17, 2014  
Laboratory Reference: 1405-144  
Project: 20266.008.01.02

**TOTAL IRON  
EPA 6010C  
MS/MSD QUALITY CONTROL**

Date Extracted: 5-27-14

Date Analyzed: 5-27-14

Matrix: Water

Units: ug/L (ppb)

Lab ID: 05-144-04

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Iron	22200	<b>23100</b>	99	<b>23500</b>	101	1	

Date of Report: June 2, 2014  
 Samples Submitted: May 17, 2014  
 Laboratory Reference: 1405-144  
 Project: 20266.008.01.02

# HALOGENATED VOLATILES EPA 8260C

Matrix: Water  
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID: 14-AREPL-MW10-GW</b>						
<b>Laboratory ID: 05-144-01</b>						
Vinyl Chloride	ND	0.20	EPA 8260C	5-22-14	5-22-14	
1,1-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
Trichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
Tetrachloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	<i>112</i>	<i>62-122</i>				
<i>Toluene-d8</i>	<i>100</i>	<i>70-120</i>				
<i>4-Bromofluorobenzene</i>	<i>99</i>	<i>71-120</i>				



Date of Report: June 2, 2014  
 Samples Submitted: May 17, 2014  
 Laboratory Reference: 1405-144  
 Project: 20266.008.01.02

# HALOGENATED VOLATILES EPA 8260C

Matrix: Water  
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID: 14-AREPL-MW7-GW</b>						
<b>Laboratory ID: 05-144-02</b>						
Vinyl Chloride	ND	0.20	EPA 8260C	5-22-14	5-22-14	
1,1-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
Trichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
Tetrachloroethene	18	0.20	EPA 8260C	5-22-14	5-22-14	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	<i>115</i>	<i>62-122</i>				
<i>Toluene-d8</i>	<i>98</i>	<i>70-120</i>				
<i>4-Bromofluorobenzene</i>	<i>99</i>	<i>71-120</i>				

Date of Report: June 2, 2014  
 Samples Submitted: May 17, 2014  
 Laboratory Reference: 1405-144  
 Project: 20266.008.01.02

# HALOGENATED VOLATILES EPA 8260C

Matrix: Water  
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID: 14-AREPL-MW5-GW</b>						
<b>Laboratory ID: 05-144-03</b>						
Vinyl Chloride	ND	10	EPA 8260C	5-22-14	5-22-14	
1,1-Dichloroethene	ND	10	EPA 8260C	5-22-14	5-22-14	
(trans) 1,2-Dichloroethene	ND	10	EPA 8260C	5-22-14	5-22-14	
(cis) 1,2-Dichloroethene	ND	10	EPA 8260C	5-22-14	5-22-14	
Trichloroethene	ND	10	EPA 8260C	5-22-14	5-22-14	
Tetrachloroethene	1100	10	EPA 8260C	5-22-14	5-22-14	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	<i>109</i>	<i>62-122</i>				
<i>Toluene-d8</i>	<i>94</i>	<i>70-120</i>				
<i>4-Bromofluorobenzene</i>	<i>99</i>	<i>71-120</i>				

Date of Report: June 2, 2014  
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 Laboratory Reference: 1405-144  
 Project: 20266.008.01.02

# HALOGENATED VOLATILES EPA 8260C

Matrix: Water  
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID: 14-AREPL-MW6-GW</b>						
<b>Laboratory ID: 05-144-04</b>						
Vinyl Chloride	ND	10	EPA 8260C	5-22-14	5-22-14	
1,1-Dichloroethene	ND	10	EPA 8260C	5-22-14	5-22-14	
(trans) 1,2-Dichloroethene	ND	10	EPA 8260C	5-22-14	5-22-14	
(cis) 1,2-Dichloroethene	ND	10	EPA 8260C	5-22-14	5-22-14	
Trichloroethene	ND	10	EPA 8260C	5-22-14	5-22-14	
Tetrachloroethene	1600	10	EPA 8260C	5-22-14	5-22-14	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	<i>107</i>	<i>62-122</i>				
<i>Toluene-d8</i>	<i>93</i>	<i>70-120</i>				
<i>4-Bromofluorobenzene</i>	<i>97</i>	<i>71-120</i>				

Date of Report: June 2, 2014  
 Samples Submitted: May 17, 2014  
 Laboratory Reference: 1405-144  
 Project: 20266.008.01.02

# HALOGENATED VOLATILES EPA 8260C

Matrix: Water  
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID: 14-AREPL-MW28-GW</b>						
<b>Laboratory ID: 05-144-05</b>						
Vinyl Chloride	41	2.0	EPA 8260C	5-22-14	5-22-14	
1,1-Dichloroethene	ND	2.0	EPA 8260C	5-22-14	5-22-14	
(trans) 1,2-Dichloroethene	4.5	2.0	EPA 8260C	5-22-14	5-22-14	
(cis) 1,2-Dichloroethene	310	2.0	EPA 8260C	5-22-14	5-22-14	
Trichloroethene	31	2.0	EPA 8260C	5-22-14	5-22-14	
Tetrachloroethene	150	2.0	EPA 8260C	5-22-14	5-22-14	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	<i>111</i>	<i>62-122</i>				
<i>Toluene-d8</i>	<i>95</i>	<i>70-120</i>				
<i>4-Bromofluorobenzene</i>	<i>101</i>	<i>71-120</i>				

Date of Report: June 2, 2014  
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# HALOGENATED VOLATILES EPA 8260C

Matrix: Water  
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID: 14-AREPL-MW12S-GW</b>						
<b>Laboratory ID: 05-144-06</b>						
Vinyl Chloride	ND	0.20	EPA 8260C	5-22-14	5-22-14	
1,1-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(cis) 1,2-Dichloroethene	0.25	0.20	EPA 8260C	5-22-14	5-22-14	
Trichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
Tetrachloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	<i>115</i>	<i>62-122</i>				
<i>Toluene-d8</i>	<i>100</i>	<i>70-120</i>				
<i>4-Bromofluorobenzene</i>	<i>101</i>	<i>71-120</i>				



Date of Report: June 2, 2014  
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# HALOGENATED VOLATILES EPA 8260C

Matrix: Water  
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID: 14-AREPL-MW13-GW</b>						
<b>Laboratory ID: 05-144-07</b>						
Vinyl Chloride	ND	0.20	EPA 8260C	5-22-14	5-22-14	
1,1-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(cis) 1,2-Dichloroethene	0.26	0.20	EPA 8260C	5-22-14	5-22-14	
Trichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
Tetrachloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	<i>119</i>	<i>62-122</i>				
<i>Toluene-d8</i>	<i>100</i>	<i>70-120</i>				
<i>4-Bromofluorobenzene</i>	<i>105</i>	<i>71-120</i>				

Date of Report: June 2, 2014  
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# HALOGENATED VOLATILES EPA 8260C

Matrix: Water  
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID: 14-AREPL-DPB24-GW</b>						
<b>Laboratory ID: 05-144-08</b>						
Vinyl Chloride	ND	0.20	EPA 8260C	5-22-14	5-22-14	
1,1-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
Trichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
Tetrachloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	<i>118</i>	<i>62-122</i>				
<i>Toluene-d8</i>	<i>101</i>	<i>70-120</i>				
<i>4-Bromofluorobenzene</i>	<i>103</i>	<i>71-120</i>				

Date of Report: June 2, 2014  
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# HALOGENATED VOLATILES EPA 8260C

Matrix: Water  
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID: 14-AREPL-MW8-GW</b>						
<b>Laboratory ID: 05-144-09</b>						
Vinyl Chloride	ND	0.20	EPA 8260C	5-22-14	5-22-14	
1,1-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
Trichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
Tetrachloroethene	0.81	0.20	EPA 8260C	5-22-14	5-22-14	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	<i>116</i>	<i>62-122</i>				
<i>Toluene-d8</i>	<i>101</i>	<i>70-120</i>				
<i>4-Bromofluorobenzene</i>	<i>103</i>	<i>71-120</i>				

Date of Report: June 2, 2014  
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# HALOGENATED VOLATILES EPA 8260C

Matrix: Water  
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID: 14-AREPL-4GMW-12-GW</b>						
<b>Laboratory ID: 05-144-10</b>						
Vinyl Chloride	ND	0.20	EPA 8260C	5-22-14	5-22-14	
1,1-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
Trichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
Tetrachloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	<i>120</i>	<i>62-122</i>				
<i>Toluene-d8</i>	<i>101</i>	<i>70-120</i>				
<i>4-Bromofluorobenzene</i>	<i>101</i>	<i>71-120</i>				

Date of Report: June 2, 2014  
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# HALOGENATED VOLATILES EPA 8260C

Matrix: Water  
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID: 14-AREPL-4GMW-13-GW</b>						
<b>Laboratory ID: 05-144-11</b>						
Vinyl Chloride	ND	0.20	EPA 8260C	5-22-14	5-22-14	
1,1-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
Trichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
Tetrachloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	<i>117</i>	<i>62-122</i>				
<i>Toluene-d8</i>	<i>100</i>	<i>70-120</i>				
<i>4-Bromofluorobenzene</i>	<i>106</i>	<i>71-120</i>				



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# HALOGENATED VOLATILES EPA 8260C

Matrix: Water  
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID: 14-AREPL-4GMW-14-GW</b>						
<b>Laboratory ID: 05-144-12</b>						
Vinyl Chloride	9.8	0.40	EPA 8260C	5-22-14	5-22-14	
1,1-Dichloroethene	ND	0.40	EPA 8260C	5-22-14	5-22-14	
(trans) 1,2-Dichloroethene	0.79	0.40	EPA 8260C	5-22-14	5-22-14	
(cis) 1,2-Dichloroethene	81	0.40	EPA 8260C	5-22-14	5-22-14	
Trichloroethene	ND	0.40	EPA 8260C	5-22-14	5-22-14	
Tetrachloroethene	ND	0.40	EPA 8260C	5-22-14	5-22-14	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	<i>112</i>	<i>62-122</i>				
<i>Toluene-d8</i>	<i>96</i>	<i>70-120</i>				
<i>4-Bromofluorobenzene</i>	<i>102</i>	<i>71-120</i>				

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# HALOGENATED VOLATILES EPA 8260C

Matrix: Water  
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID: 14-AREPL-4GMW-15-GW</b>						
<b>Laboratory ID: 05-144-13</b>						
Vinyl Chloride	9.6	0.20	EPA 8260C	5-22-14	5-22-14	
1,1-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(trans) 1,2-Dichloroethene	0.27	0.20	EPA 8260C	5-22-14	5-22-14	
(cis) 1,2-Dichloroethene	8.9	0.20	EPA 8260C	5-22-14	5-22-14	
Trichloroethene	0.86	0.20	EPA 8260C	5-22-14	5-22-14	
Tetrachloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	<i>116</i>	<i>62-122</i>				
<i>Toluene-d8</i>	<i>101</i>	<i>70-120</i>				
<i>4-Bromofluorobenzene</i>	<i>105</i>	<i>71-120</i>				

Date of Report: June 2, 2014  
 Samples Submitted: May 17, 2014  
 Laboratory Reference: 1405-144  
 Project: 20266.008.01.02

# HALOGENATED VOLATILES EPA 8260C

Matrix: Water  
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID: 14-AREPL-MW80-GW</b>						
<b>Laboratory ID: 05-144-14</b>						
Vinyl Chloride	ND	0.20	EPA 8260C	5-22-14	5-22-14	
1,1-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
Trichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
Tetrachloroethene	0.82	0.20	EPA 8260C	5-22-14	5-22-14	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	<i>116</i>	<i>62-122</i>				
<i>Toluene-d8</i>	<i>100</i>	<i>70-120</i>				
<i>4-Bromofluorobenzene</i>	<i>106</i>	<i>71-120</i>				

Date of Report: June 2, 2014  
 Samples Submitted: May 17, 2014  
 Laboratory Reference: 1405-144  
 Project: 20266.008.01.02

# HALOGENATED VOLATILES EPA 8260C

Matrix: Water  
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID: 14-AREPL-MW60-GW</b>						
<b>Laboratory ID: 05-144-15</b>						
Vinyl Chloride	ND	10	EPA 8260C	5-22-14	5-22-14	
1,1-Dichloroethene	ND	10	EPA 8260C	5-22-14	5-22-14	
(trans) 1,2-Dichloroethene	ND	10	EPA 8260C	5-22-14	5-22-14	
(cis) 1,2-Dichloroethene	ND	10	EPA 8260C	5-22-14	5-22-14	
Trichloroethene	ND	10	EPA 8260C	5-22-14	5-22-14	
Tetrachloroethene	1700	10	EPA 8260C	5-22-14	5-22-14	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	<i>107</i>	<i>62-122</i>				
<i>Toluene-d8</i>	<i>94</i>	<i>70-120</i>				
<i>4-Bromofluorobenzene</i>	<i>98</i>	<i>71-120</i>				

Date of Report: June 2, 2014  
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# HALOGENATED VOLATILES EPA 8260C

Matrix: Water

Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID: 14-AREPL-TB</b>						
<b>Laboratory ID: 05-144-16</b>						
Vinyl Chloride	ND	0.20	EPA 8260C	5-22-14	5-22-14	
1,1-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
Trichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
Tetrachloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	<i>108</i>	<i>62-122</i>				
<i>Toluene-d8</i>	<i>99</i>	<i>70-120</i>				
<i>4-Bromofluorobenzene</i>	<i>98</i>	<i>71-120</i>				



Date of Report: June 2, 2014  
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**HALOGENATED VOLATILES EPA 8260C  
 METHOD BLANK QUALITY CONTROL**

Matrix: Water

Units: ug/L

<b>Analyte</b>	<b>Result</b>	<b>PQL</b>	<b>Method</b>	<b>Date Prepared</b>	<b>Date Analyzed</b>	<b>Flags</b>
<hr/>						
Laboratory ID:	MB0522W1					
Vinyl Chloride	ND	0.20	EPA 8260C	5-22-14	5-22-14	
1,1-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
Trichloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
Tetrachloroethene	ND	0.20	EPA 8260C	5-22-14	5-22-14	
<hr/>						
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	<i>113</i>	<i>62-122</i>				
<i>Toluene-d8</i>	<i>101</i>	<i>70-120</i>				
<i>4-Bromofluorobenzene</i>	<i>99</i>	<i>71-120</i>				

Date of Report: June 2, 2014  
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 Laboratory Reference: 1405-144  
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**HALOGENATED VOLATILES EPA 8260C  
 SB/SBD QUALITY CONTROL**

Matrix: Water

Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0522W1									
	SB	SBD	SB	SBD	SB	SBD				
1,1-Dichloroethene	10.5	10.9	10.0	10.0	105	109	63-142	4	17	
Benzene	9.45	10.1	10.0	10.0	95	101	78-125	7	15	
Trichloroethene	9.73	10.0	10.0	10.0	97	100	80-125	2	15	
Toluene	9.74	10.0	10.0	10.0	97	100	80-125	2	15	
Chlorobenzene	9.45	9.68	10.0	10.0	95	97	80-140	2	15	
Surrogate:										
Dibromofluoromethane					107	110	62-122			
Toluene-d8					99	99	70-120			
4-Bromofluorobenzene					97	100	71-120			

Date of Report: June 2, 2014  
 Samples Submitted: May 17, 2014  
 Laboratory Reference: 1405-144  
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**DISSOLVED IRON  
 EPA 6010C**

Matrix: Water  
 Units: ug/L (ppb)

<b>Analyte</b>	<b>Result</b>	<b>PQL</b>	<b>EPA Method</b>	<b>Date Prepared</b>	<b>Date Analyzed</b>	<b>Flags</b>
Lab ID: 05-144-01 <b>Client ID: 14-AREPL-MW10-GW</b>						
Iron	<b>11000</b>	56	6010C		5-27-14	
Lab ID: 05-144-03 <b>Client ID: 14-AREPL-MW5-GW</b>						
Iron	<b>7200</b>	56	6010C		5-27-14	
Lab ID: 05-144-04 <b>Client ID: 14-AREPL-MW6-GW</b>						
Iron	<b>1100</b>	56	6010C		5-27-14	
Lab ID: 05-144-05 <b>Client ID: 14-AREPL-MW28-GW</b>						
Iron	<b>130</b>	56	6010C		5-27-14	
Lab ID: 05-144-13 <b>Client ID: 14-AREPL-4GMW-15-GW</b>						
Iron	<b>7600</b>	56	6010C		5-27-14	

Date of Report: June 2, 2014  
Samples Submitted: May 17, 2014  
Laboratory Reference: 1405-144  
Project: 20266.008.01.02

**DISSOLVED IRON  
EPA 6010C  
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 5-27-14  
  
Matrix: Water  
Units: ug/L (ppb)  
  
Lab ID: MB0527DM1

Analyte	Method	Result	PQL
Iron	6010C	<b>ND</b>	56

Date of Report: June 2, 2014  
Samples Submitted: May 17, 2014  
Laboratory Reference: 1405-144  
Project: 20266.008.01.02

**DISSOLVED IRON  
EPA 6010C  
DUPLICATE QUALITY CONTROL**

Date Analyzed: 5-27-14

Matrix: Water

Units: ug/L (ppb)

Lab ID: 05-144-04

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Iron	<b>1070</b>	<b>1080</b>	1	56	



Date of Report: June 2, 2014  
Samples Submitted: May 17, 2014  
Laboratory Reference: 1405-144  
Project: 20266.008.01.02

**DISSOLVED IRON  
EPA 6010C  
MS/MSD QUALITY CONTROL**

Date Analyzed: 5-27-14

Matrix: Water  
Units: ug/L (ppb)

Lab ID: 05-144-04

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Iron	22200	<b>23400</b>	101	<b>23100</b>	99	1	



### Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
- B - The analyte indicated was also found in the blank sample.
- C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
- E - The value reported exceeds the quantitation range and is an estimate.
- F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
- H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
- I - Compound recovery is outside of the control limits.
- J - The value reported was below the practical quantitation limit. The value is an estimate.
- K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
- L - The RPD is outside of the control limits.
- M - Hydrocarbons in the gasoline range are impacting the diesel range result.
- M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
- N - Hydrocarbons in the lube oil range are impacting the diesel range result.
- N1 - Hydrocarbons in diesel range are impacting lube oil range results.
- O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
- P - The RPD of the detected concentrations between the two columns is greater than 40.
- Q - Surrogate recovery is outside of the control limits.
- S - Surrogate recovery data is not available due to the necessary dilution of the sample.
- T - The sample chromatogram is not similar to a typical \_\_\_\_\_.
- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- U1 - The practical quantitation limit is elevated due to interferences present in the sample.
- V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
- W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
- X - Sample extract treated with a mercury cleanup procedure.
- X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
- Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
- Z -
- ND - Not Detected at PQL
- PQL - Practical Quantitation Limit
- RPD - Relative Percent Difference



Microseeps/Pace Analytical Energy Services, LLC  
220 William Pitt Way  
Pittsburgh, PA 15238  
Phone: (412) 826-5245  
Fax: (412) 826-3433

May 29, 2014

David Baumeister  
OnSite Environmental, Inc.  
14648 NE 95th Street  
Redmond, WA 98052

RE: **20266.008.01.02**

*Microseeps Workorder: 12223*

Dear David Baumeister:

Enclosed are the analytical results for sample(s) received by the laboratory on Wednesday, May 21, 2014. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Robbin Robl 05/29/2014  
rrobl@microseeps.com

Customer Service Representative

Enclosures

As a valued client we would appreciate your comments on our service.  
Please email [info@microseeps.com](mailto:info@microseeps.com).

Total Number of Pages 17

Report ID: 12223 - 526614

Page 1 of 12



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220 William Pitt Way  
Pittsburgh, PA 15238  
Phone: (412) 826-5245  
Fax: (412) 826-3433

## LABORATORY ACCREDITATIONS & CERTIFICATIONS

<b>Accreditor:</b>	Pennsylvania Department of Environmental Protection, Bureau of Laboratories
<b>Accreditation ID:</b>	02-00538
<b>Scope:</b>	NELAP Non-Potable Water and Solid & Hazardous Waste
<b>Accreditor:</b>	NELAP: State of Florida, Department of Health, Bureau of Laboratories
<b>Accreditation ID:</b>	E87832
<b>Scope:</b>	Clean Water Act (CWA)                      Resource Conservation and Recovery Act (RCRA)
<b>Accreditor:</b>	South Carolina Department of Health and Environmental Control, Office of Environmental Laboratory Certification
<b>Accreditation ID:</b>	89009003
<b>Scope:</b>	Clean Water Act (CWA); Resource Conservation and Recovery Act (RCRA)
<b>Accreditor:</b>	NELAP: State of Louisiana, Department of Environmental Quality
<b>Accreditation ID:</b>	04104
<b>Scope:</b>	Solid and Chemical Materials; Non-Potable Water
<b>Accreditor:</b>	NELAP: New Jersey, Department of Environmental Protection
<b>Accreditation ID:</b>	PA026
<b>Scope:</b>	Non-Potable Water; Solid and Chemical Materials
<b>Accreditor:</b>	NELAP: New York, Department of Health Wadsworth Center
<b>Accreditation ID:</b>	11815
<b>Scope:</b>	Non-Potable Water; Solid and Hazardous Waste
<b>Accreditor:</b>	State of Connecticut, Department of Public Health, Division of Environmental Health
<b>Accreditation ID:</b>	PH-0263
<b>Scope:</b>	Clean Water Act (CWA) Resource Conservation and Recovery Act (RCRA)
<b>Accreditor:</b>	NELAP: Texas, Commission on Environmental Quality
<b>Accreditation ID:</b>	T104704453-09-TX
<b>Scope:</b>	Non-Potable Water
<b>Accreditor:</b>	State of New Hampshire
<b>Accreditation ID:</b>	299409
<b>Scope:</b>	Non-potable water
<b>Accreditor:</b>	State of Georgia
<b>Accreditation ID:</b>	Chapter 391-3-26
<b>Scope:</b>	As per the Georgia EPD Rules and Regulations for Commercial Laboratories, Microseeps is accredited by the Pennsylvania Department of Environmental Protection Bureau of Laboratories under the National Environmental Laboratory Approval Program (NELAC).



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Phone: (412) 826-5245  
Fax: (412) 826-3433

## SAMPLE SUMMARY

Workorder: 12223 20266.008.01.02

Lab ID	Sample ID	Matrix	Date Collected	Date Received
122230001	14-AREPL-MW-10-GW	Water	5/15/2014 16:12	5/21/2014 10:45
122230002	14-AREPL-MW-5-GW	Water	5/14/2014 18:20	5/21/2014 10:45
122230003	14-AREPL-MW-6-GW	Water	5/13/2014 17:08	5/21/2014 10:45
122230004	14-AREPL-MW-28-GW	Water	5/14/2014 16:03	5/21/2014 10:45
122230005	14-AREPL-46MW-15-GW	Water	5/15/2014 10:54	5/21/2014 10:45



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Fax: (412) 826-3433

## ANALYTICAL RESULTS

Workorder: 12223 20266.008.01.02

Lab ID: 122230001

Date Received: 5/21/2014 10:45 Matrix: Water

Sample ID: 14-AREPL-MW-10-GW

Date Collected: 5/15/2014 16:12

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
------------	---------	-------	-----	-----	----	----------	----	----------	----	------

### RISK - MICR

Analysis Desc: AM20GAX

Analytical Method: AM20GAX

Methane	0.23	ug/l	0.10	0.042	1			5/28/2014 17:34	BW
Ethane	0.0059J	ug/l	0.025	0.0020	1			5/28/2014 17:34	BW
Ethene	0.015J	ug/l	0.025	0.0030	1			5/28/2014 17:34	BW



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## ANALYTICAL RESULTS

Workorder: 12223 20266.008.01.02

Lab ID: 122230002  
Sample ID: 14-AREPL-MW-5-GW

Date Received: 5/21/2014 10:45 Matrix: Water  
Date Collected: 5/14/2014 18:20

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
<b>RISK - MICR</b>										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	0.25	ug/l	0.10	0.042	1			5/28/2014 17:45	BW	
Ethane	0.014J	ug/l	0.025	0.0020	1			5/28/2014 17:45	BW	
Ethene	0.013J	ug/l	0.025	0.0030	1			5/28/2014 17:45	BW	



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## ANALYTICAL RESULTS

Workorder: 12223 20266.008.01.02

Lab ID: 122230003  
Sample ID: 14-AREPL-MW-6-GW

Date Received: 5/21/2014 10:45 Matrix: Water  
Date Collected: 5/13/2014 17:08

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
<b>RISK - MICR</b>										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	0.26	ug/l	0.10	0.042	1			5/27/2014 13:00	BW	
Ethane	0.018J	ug/l	0.025	0.0020	1			5/27/2014 13:00	BW	
Ethene	0.015J	ug/l	0.025	0.0030	1			5/27/2014 13:00	BW	



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## ANALYTICAL RESULTS

Workorder: 12223 20266.008.01.02

Lab ID: 122230004

Date Received: 5/21/2014 10:45 Matrix: Water

Sample ID: 14-AREPL-MW-28-GW

Date Collected: 5/14/2014 16:03

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
<b>RISK - MICR</b>										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	260	ug/l	0.10	0.042	1			5/28/2014 17:55	BW	
Ethane	0.11	ug/l	0.025	0.0020	1			5/28/2014 17:55	BW	
Ethene	4.9	ug/l	0.025	0.0030	1			5/28/2014 17:55	BW	



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## ANALYTICAL RESULTS

Workorder: 12223 20266.008.01.02

Lab ID: 122230005

Date Received: 5/21/2014 10:45 Matrix: Water

Sample ID: 14-AREPL-46MW-15-GW

Date Collected: 5/15/2014 10:54

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
<b>RISK - MICR</b>										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	1300	ug/l	0.10	0.042	1			5/28/2014 18:04	BW	
Ethane	0.30	ug/l	0.025	0.0020	1			5/28/2014 18:04	BW	
Ethene	6.3	ug/l	0.025	0.0030	1			5/28/2014 18:04	BW	



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## ANALYTICAL RESULTS QUALIFIERS

Workorder: 12223 20266.008.01.02

### DEFINITIONS/QUALIFIERS

**Disclaimer :** The Pennsylvania Department of Environmental Protection (PADEP) has decided to no longer recognize analyses that do not produce data for primary compliance, for NELAP accreditation. The methods affected by this decision are AM20Gax, AM21G, SW846 7199 and AM4.02. The laboratory shall continue to administer the NELAP/TNI standard requirements in the performance of these methods.

MDL	Method Detection Limit. Can be used synonymously with LOD; Limit Of Detection.
PQL	Practical Quantitation Limit. Can be used synonymously with LOQ; Limit Of Quantitation.
ND	Not detected at or above reporting limit.
DF	Dilution Factor.
S	Surrogate.
RPD	Relative Percent Difference.
% Rec	Percent Recovery.
U	Indicates the compound was analyzed for, but not detected at or above the noted concentration.
J	Estimated concentration greater than the set method detection limit (MDL) and less than the set reporting limit (PQL).



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## QUALITY CONTROL DATA

Workorder: 12223 20266.008.01.02

QC Batch: DISG/3796 Analysis Method: AM20GAX  
QC Batch Method: AM20GAX  
Associated Lab Samples: 122230003

METHOD BLANK: 27946

Parameter	Units	Blank Result	Reporting Limit Qualifiers
RISK			
Methane	ug/l	0.10 U	0.10
Ethane	ug/l	0.025 U	0.025
Ethene	ug/l	0.025 U	0.025

LABORATORY CONTROL SAMPLE & LCSD: 27947 27948

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK										
Methane	ug/l	750	690	700	93	93	80-120	0	20	
Ethane	ug/l	38	37	38	98	100	80-120	2	20	
Ethene	ug/l	35	34	35	97	100	80-120	3	20	



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## QUALITY CONTROL DATA

Workorder: 12223 20266.008.01.02

QC Batch: DISG/3801 Analysis Method: AM20GAX

QC Batch Method: AM20GAX

Associated Lab Samples: 122230001, 122230002, 122230004, 122230005

METHOD BLANK: 27987

Parameter	Units	Blank Result	Reporting Limit Qualifiers
RISK			
Methane	ug/l	0.10 U	0.10
Ethane	ug/l	0.025 U	0.025
Ethene	ug/l	0.025 U	0.025

LABORATORY CONTROL SAMPLE & LCSD: 27988 27989

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD Qualifiers
RISK									
Methane	ug/l	750	760	760	102	102	80-120	0	20
Ethane	ug/l	38	40	40	105	104	80-120	0.96	20
Ethene	ug/l	35	37	36	105	103	80-120	1.9	20



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## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 12223 20266.008.01.02

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
122230003	14-AREPL-MW-6-GW			AM20GAX	DISG/3796
122230001	14-AREPL-MW-10-GW			AM20GAX	DISG/3801
122230002	14-AREPL-MW-5-GW			AM20GAX	DISG/3801
122230004	14-AREPL-MW-28-GW			AM20GAX	DISG/3801
122230005	14-AREPL-46MW-15-GW			AM20GAX	DISG/3801



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Subcontract Laboratory: Microseep

**Attention:**

**Address:**

Phone Number: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Page 1 of 1

12223

Laboratory Reference #: 05-144

**Project Manager: David Baumeister**

email: [dbaumeister@onsite-env.com](mailto:dbaumeister@onsite-env.com)

Project Number: 20266.008.01.02

**Project Name:** \_\_\_\_\_

### Turnaround Request:

**1 Day      2 Day      3 Day**

**Standard**

Other: \_\_\_\_\_

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analysis
1	14-AREPL-MW-10-GW	5/15/14	1612	GW	2	Methane, Ethane, Ethene
2	14-AREPL-MW-5-GW	5/14/14	1820	↓	↓	↓ ↓ ↓
3	14-AREPL-MW-6-GW	5/13/14	1708	↓	↓	↓ ↓ ↓
4	14-AREPL-MW-28-GW	5/14/14	1603	↓	↓	↓ ↓ ↓
5	14-AREPL-46MW-15-GW	5/15/14	1054	↓	↓	↓ ↓ ↓
Signature		Company		Date	Time	Comments/Special Instructions
Relinquished by:		DSE		5/20/14	1600	2°C
Received by:		UPS		5-21-14	1045	
Relinquished by:						
Received by:						
Relinquished by:						
Received by:						

NON-CONFORMANCE FORM

Microseeps Project Number: 12223

Date: 5.21.14 Time of Receipt: 1045 Receiver: LY

Client: On Site

REASON FOR NON-CONFORMANCE:

1. 14- AREPL- MW-5- GW COC time 1820  
Vial time 1800
2. 14- AREPL- MW-28- GW COC time 1603  
Vials time 1620.

ACTION TAKEN:

Client name: David Baumeister Date: 5/22/14 Time: email

Per attached email- log according to COC.

Customer Service Initials: RL

Date: 5/23/14



## Ruth Welsh

---

**From:** David Baumeister <[dbaumeister@onsite-env.com](mailto:dbaumeister@onsite-env.com)>  
**Sent:** Thursday, May 22, 2014 4:25 PM  
**To:** Chris Thomas  
**Subject:** RE: 20266.008.01.02 #12223

Hi Chris. Go with the COC please.

David



*Please note that OnSite Environmental, Inc. will be closed on Memorial Day, May 26th.*

***If you are in need of a hardcopy of your report or your invoice, please let me know.***

---

David A. Baumeister  
Project Manager



*Celebrating over 20 years in business*

14648 NE 95<sup>th</sup> Street, Redmond, WA 98052  
T: 425.883.3881 C: 206.550.2483  
[dbaumeister@onsite-env.com](mailto:dbaumeister@onsite-env.com)  
[www.onsite-env.com](http://www.onsite-env.com)

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---

**From:** Chris Thomas [<mailto:CThomas@microseeps.com>]  
**Sent:** Thursday, May 22, 2014 12:52 PM  
**To:** David Baumeister  
**Subject:** 20266.008.01.02 #12223

David,

We received samples for project #20266.008.01.02. For sample 14-AREPL-MW-5-GW the COC time was 18:20 but the vials time was 18:00.  
Also, for sample 14-AREPL-MW-28-GW the COC time was 16:03 but the vials time was 16:20. If you could please let us know what time to use for log-in we can proceed with the analysis.

Thanks,  
Chris

Christopher Thomas  
Microseeps, a Division of Pace Analytical Energy Services, LLC  
220 William Pitt Way  
Pittsburgh, PA 15238

Office: 412-826-5245  
Direct: 412-826-4481

Disclaimer: This message contains confidential information and is intended only for the individual(s) named. If you are not the named addressee, you should permanently delete this e-mail from your system and should not disseminate, distribute or copy this e-mail. E-mail transmission cannot be guaranteed to be secure or error-free as information delivered over the internet could be corrupted, lost, destroyed, delayed, or contain viruses

## Cooler Receipt Form

Client Name: On site Project: 20266.008.01.02 Lab Work Order: 12223

**A. Shipping/Container Information** (circle appropriate response)

Courier: FedEx UPS USPS Client Other: \_\_\_\_\_ Air bill Present: Yes No

Tracking Number: 1Z684 E1W019130 6976

Custody Seal on Cooler/Box Present: Yes No Seals Intact: Yes No

Cooler/Box Packing Material: Bubble Wrap Absorbent Foam Other: \_\_\_\_\_

Type of Ice: Wet Blue None Ice Intact: Yes Melted

Cooler Temperature: 20C Radiation Screened: Yes No Chain of Custody Present: Yes No

Comments: \_\_\_\_\_

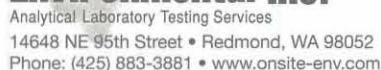
**B. Laboratory Assignment/Log-in** (check appropriate response)

	YES	NO	N/A	Comment Reference non-Conformance
Chain of Custody properly filled out	<input checked="" type="checkbox"/>			
Chain of Custody relinquished	<input checked="" type="checkbox"/>			
Sampler Name & Signature on COC		<input checked="" type="checkbox"/>		
Containers intact	<input checked="" type="checkbox"/>			
Were samples in separate bags	<input checked="" type="checkbox"/>			
Sample container labels match COC Sample name/date and time collected		<input checked="" type="checkbox"/>		
Sufficient volume provided	<input checked="" type="checkbox"/>			
Microseeps containers used	<input checked="" type="checkbox"/>			
Are containers properly preserved for the requested testing? (as labeled)	<input checked="" type="checkbox"/>			
If an unknown preservation state, were containers checked? Exception: VOA's coliform			<input checked="" type="checkbox"/>	If yes, see pH form.
Was volume for dissolved testing field filtered, as noted on the COC? Was volume received in a preserved container?			<input checked="" type="checkbox"/>	

Comments: \_\_\_\_\_

Cooler contents examined/received by: LY Date: 5.21.14

Project Manager Review: RR Date: 5/23/14

Page 1 of 2


Sampled by:  
FREITAS, GEILICH, FOX

☐ \_\_\_\_\_  
(other)

Number of Containers

05-144

[illegible]

	Signature	Company	Date	Time	Comments/Special Instructions		
Relinquished		Ahtm	5/16/14	1415	TDC by SM5310B		
Received					5/17/14	1010	N/N by EPA 353.2
Relinquished							SULFATE by ASTM D516-07
Received							Total Iron by EPA 6010
Relinquished							Dissolved Iron by EPA 6010
Received							MTE by AMZDGAX
Relinquished							* - PCE, TCE, cDCE, + DCE, 1,1-DCE, VC.
Received							
Reviewed/Date	Reviewed/Date		Chromatograms with final report <input type="checkbox"/>				





# OnSite Environmental Inc.

Analytical Laboratory Testing Services  
14648 NE 95th Street • Redmond, WA 98052  
Phone: (425) 883-3881 • www.onsite-env.com

## Chain of Custody

Page 2 of 2

Company: Ah See First page

Project Number:

Project Name:

Project Manager:

Sampled by:

**Turnaround Request (in working days)**

(Check One)

☐ Same Day ☐ 1 Day

☐ 2 Days ☐ 3 Days

☒ Standard (7 Days)  
(TPH analysis 5 Days)

☐ \_\_\_\_\_ (other)

Laboratory Number:

**05-144**

Lab ID		Sample Identification	Date Sampled	Time Sampled	Matrix	Number	NAFTHA	NAFTHA	NAFTHA	NAFTHA	Volatiles	Halogen	Semivolatiles (with toluene)	PAHs 66	MEL	PCBs 28	Organochlorine	Organophosphorus	Chlorinated	Total PC	Total MH	TCLP M	HEM test							% Moisture
11		14-AREPL-4GMW-13-GW	5/15	1310	GW	3					X																			
12		14-AREPL-4GMW-14-GW	5/15	1448	GW	3					X																			
13		14-AREPL-4GMW-15-GW	5/15	1054	GW	16	X	X	X	X	X	X			X															
14		14-AREPL-MW80-GW	5/14	1250	GW	3					X																			
15		14-AREPL-MW60-GW	5/13	1708	GW	3					X																			
16		14-AREPL-TB	5/13	0900	GW	2					X																			

Signature	Company	Date	Time	Comments/Special Instructions
<u>[Signature]</u>	<u>Ah See</u>	<u>5/16/14</u>	<u>1415</u>	
<u>[Signature]</u>	<u>OnSite Env</u>	<u>5/17/14</u>	<u>1410</u>	
Relinquished				
Received				
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date	Reviewed/Date	Chromatograms with final report <input type="checkbox"/>		

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14648 NE 95<sup>th</sup> Street, Redmond, WA 98052 • (425) 883-3881

July 8, 2014

Olga Stewart  
Ahtna Engineering Services LLC  
305 34<sup>th</sup> Avenue  
Fairbanks, AK 99701

Re: Analytical Data for Project 20266.008.01.02  
Laboratory Reference No. 1405-144B

Dear Olga:

Enclosed are the analytical results and associated quality control data for samples submitted on May 17, 2014.

**Please note that this report reflects the addition of the MDLs to the analytical data.**

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "DB", with a long horizontal line extending to the right.

David Baumeister  
Project Manager

Enclosures

Date of Report: July 8, 2014  
Samples Submitted: May 17, 2014  
Laboratory Reference: 1405-144B  
Project: 20266.008.01.02

### **Case Narrative**

Samples were collected on June 5, 2014 and received by the laboratory on June 5, 2014. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: July 8, 2014  
 Samples Submitted: May 17, 2014  
 Laboratory Reference: 1405-144B  
 Project: 20266.008.01.02

# **VOLATILES EPA 8260C**

Matrix: Water  
 Units: ug/L

Analyte	Result	PQL	MDL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID: 14-AREPL-MW5-GW</b>							
Laboratory ID: 05-144-03							
Vinyl Chloride	ND	10	3.1	EPA 8260C	5-22-14	5-22-14	
1,1-Dichloroethene	ND	10	3.4	EPA 8260C	5-22-14	5-22-14	
(trans) 1,2-Dichloroethene	ND	10	3.0	EPA 8260C	5-22-14	5-22-14	
(cis) 1,2-Dichloroethene	ND	10	2.3	EPA 8260C	5-22-14	5-22-14	
Trichloroethene	ND	10	5.5	EPA 8260C	5-22-14	5-22-14	
Tetrachloroethene	1100	10	3.3	EPA 8260C	5-22-14	5-22-14	B1
<i>Surrogate: Percent Recovery Control Limits</i>							
<i>Dibromofluoromethane</i>	<i>109</i>	<i>62-122</i>					
<i>Toluene-d8</i>	<i>94</i>	<i>70-120</i>					
<i>4-Bromofluorobenzene</i>	<i>99</i>	<i>71-120</i>					

Date of Report: July 8, 2014  
 Samples Submitted: May 17, 2014  
 Laboratory Reference: 1405-144B  
 Project: 20266.008.01.02

# **VOLATILES EPA 8260C**

Matrix: Water  
 Units: ug/L

Analyte	Result	PQL	MDL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID: 14-AREPL-MW6-GW</b>							
<b>Laboratory ID: 05-144-04</b>							
Vinyl Chloride	ND	10	3.1	EPA 8260C	5-22-14	5-22-14	
1,1-Dichloroethene	ND	10	3.4	EPA 8260C	5-22-14	5-22-14	
(trans) 1,2-Dichloroethene	ND	10	3.0	EPA 8260C	5-22-14	5-22-14	
(cis) 1,2-Dichloroethene	ND	10	2.3	EPA 8260C	5-22-14	5-22-14	
Trichloroethene	ND	10	5.5	EPA 8260C	5-22-14	5-22-14	
Tetrachloroethene	1600	10	3.3	EPA 8260C	5-22-14	5-22-14	B1
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>					
<i>Dibromofluoromethane</i>	<i>107</i>	<i>62-122</i>					
<i>Toluene-d8</i>	<i>93</i>	<i>70-120</i>					
<i>4-Bromofluorobenzene</i>	<i>97</i>	<i>71-120</i>					

Date of Report: July 8, 2014  
 Samples Submitted: May 17, 2014  
 Laboratory Reference: 1405-144B  
 Project: 20266.008.01.02

# **VOLATILES EPA 8260C**

Matrix: Water  
 Units: ug/L

Analyte	Result	PQL	MDL	Method	Date Prepared	Date Analyzed	Flags
<b>Client ID: 14-AREPL-MW60-GW</b>							
<b>Laboratory ID: 05-144-15</b>							
Vinyl Chloride	ND	10	3.1	EPA 8260C	5-22-14	5-22-14	
1,1-Dichloroethene	ND	10	3.4	EPA 8260C	5-22-14	5-22-14	
(trans) 1,2-Dichloroethene	ND	10	3.0	EPA 8260C	5-22-14	5-22-14	
(cis) 1,2-Dichloroethene	ND	10	2.3	EPA 8260C	5-22-14	5-22-14	
Trichloroethene	ND	10	5.5	EPA 8260C	5-22-14	5-22-14	
Tetrachloroethene	1700	10	3.3	EPA 8260C	5-22-14	5-22-14	B1
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>					
<i>Dibromofluoromethane</i>	<i>107</i>	<i>62-122</i>					
<i>Toluene-d8</i>	<i>94</i>	<i>70-120</i>					
<i>4-Bromofluorobenzene</i>	<i>98</i>	<i>71-120</i>					

Date of Report: July 8, 2014  
 Samples Submitted: May 17, 2014  
 Laboratory Reference: 1405-144B  
 Project: 20266.008.01.02

**VOLATILES by EPA 8260C**  
**METHOD BLANK QUALITY CONTROL**

Matrix: Water

Units: ug/L

<b>Analyte</b>	<b>Result</b>	<b>PQL</b>	<b>MDL</b>	<b>Method</b>	<b>Date Prepared</b>	<b>Date Analyzed</b>	<b>Flags</b>
Laboratory ID: MB0522W1							
Vinyl Chloride	ND	0.20	0.063	EPA 8260C	5-22-14	5-22-14	
1,1-Dichloroethene	ND	0.20	0.068	EPA 8260C	5-22-14	5-22-14	
(trans) 1,2-Dichloroethene	ND	0.20	0.059	EPA 8260C	5-22-14	5-22-14	
(cis) 1,2-Dichloroethene	ND	0.20	0.046	EPA 8260C	5-22-14	5-22-14	
Trichloroethene	ND	0.20	0.11	EPA 8260C	5-22-14	5-22-14	
Tetrachloroethene	0.095	0.20	0.065	EPA 8260C	5-22-14	5-22-14	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>					
<i>Dibromofluoromethane</i>	<i>113</i>	<i>62-122</i>					
<i>Toluene-d8</i>	<i>101</i>	<i>70-120</i>					
<i>4-Bromofluorobenzene</i>	<i>99</i>	<i>71-120</i>					



Date of Report: July 8, 2014  
 Samples Submitted: May 17, 2014  
 Laboratory Reference: 1405-144B  
 Project: 20266.008.01.02

**VOLATILES by EPA 8260C**  
**SB/SBD QUALITY CONTROL**

Matrix: Water

Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery	RPD	RPD	Flags
					Recovery	Limits	Limits		Limit	
SPIKE BLANKS										
Laboratory ID:	SB0522W1									
	SB	SBD	SB	SBD	SB	SBD				
1,1-Dichloroethene	10.5	10.9	10.0	10.0	105	109	63-142	4	17	
Benzene	9.45	10.1	10.0	10.0	95	101	78-125	7	15	
Trichloroethene	9.73	10.0	10.0	10.0	97	100	80-125	2	15	
Toluene	9.74	10.0	10.0	10.0	97	100	80-125	2	15	
Chlorobenzene	9.45	9.68	10.0	10.0	95	97	80-140	2	15	
Surrogate:										
Dibromofluoromethane					107	110	62-122			
Toluene-d8					99	99	70-120			
4-Bromofluorobenzene					97	100	71-120			



### Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
- B - The analyte indicated was also found in the blank sample.
- B1 - Tetrachloroethene was also found in the blank sample at a level between the MDL and the PQL.
- C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
- E - The value reported exceeds the quantitation range and is an estimate.
- F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
- H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
- I - Compound recovery is outside of the control limits.
- J - The value reported was below the practical quantitation limit. The value is an estimate.
- K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
- L - The RPD is outside of the control limits.
- M - Hydrocarbons in the gasoline range are impacting the diesel range result.
- M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.
- N - Hydrocarbons in the lube oil range are impacting the diesel range result.
- N1 - Hydrocarbons in diesel range are impacting lube oil range results.
- O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
- P - The RPD of the detected concentrations between the two columns is greater than 40.
- Q - Surrogate recovery is outside of the control limits.
- S - Surrogate recovery data is not available due to the necessary dilution of the sample.
- T - The sample chromatogram is not similar to a typical \_\_\_\_\_.
- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- U1 - The practical quantitation limit is elevated due to interferences present in the sample.
- V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
- W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
- X - Sample extract treated with a mercury cleanup procedure.
- X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
- Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
- Z -

# Chain of Custody

Company: **AHTNA ENGINEERING**

Project Number: **20266-008.01.02**

Project Name: **AK REAL ESTATE**

Project Manager: **OLGA STEWART**

Sampled by: **FREITAS, GEILICH, FOX**

**Turnaround Request  
(in working days)**

(Check One)

☐ Same Day ☐ 1 Day

☐ 2 Days ☐ 3 Days

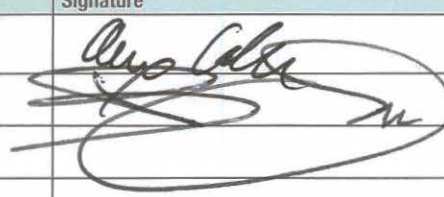

☒ Standard (7 Days)  
(TPH analysis 5 Days)

☐ \_\_\_\_\_ (other)

Laboratory Number:

**05-144**

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	Number of Containers	Number of Containers	Number of Containers	Volatiles 8260C	Heteroatoms	Semivolatiles 8270D	PAHs 8280	Metals 8210	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D	Chlorinated Acid Herbicides 8151A	Total PCBs 8210	Total MTGA Metals 8210	TEBP Metals 8210	HEM (oil and grease) 1664A	% Moisture	
1	14-AREPL-MW10-GW	5/15	1612	GW	10	X	X	X	X	X	X		X									
2	14-AREPL-MW7-GW	5/13	1045	GW	3				X													
3	14-AREPL-MW5-GW	5/14	1820	GW	10	X	X	X	X	X	X		X									
4	14-AREPL-MW6-GW	5/13	1708	GW	10	X	X	X	X	X	X		X									
5	14-AREPL-MW28-GW	5/14	1603	GW	10	X	X	X	X	X	X		X									
6	14-AREPL-MW12S-GW	5/13	1350	GW	3				X													
7	14-AREPL-MW13-GW	5/13	1530	GW	3				X													
8	14-AREPL-DPB24-GW	5/14	1047	GW	3				X													
9	14-AREPL-MW8-GW	5/14	1245	GW	3				X													
10	14-AREPL-4GMW-12-GW	5/14	1451	GW	3				X													

	Signature	Company	Date	Time	Comments/Special Instructions
Relinquished		Ahtna	5/16/14	1415	TDC by SM5310B N/N by EPA 353.2
Received		AK REAL ESTATE	5/17/14	1010	SULFATE by ASTM D516-07 Total Iron by EPA 6010 Dissolved Iron by EPA 6010 M/E/E by AM20GAX
Relinquished					
Received					
Relinquished					
Received					X - PCE, TCE, cDCE, + DCE, 1,1-DCE, VC.
Reviewed/Date		Reviewed/Date			Chromatograms with final report <input type="checkbox"/>





# OnSite Environmental Inc.

Analytical Laboratory Testing Services  
14648 NE 95th Street • Redmond, WA 98052  
Phone: (425) 883-3881 • www.onsite-env.com

## Chain of Custody

Page 2 of 2

Company: Ah See First page

Project Number:

Project Name:

Project Manager:

Sampled by:

**Turnaround Request (in working days)**

(Check One)

☐ Same Day ☐ 1 Day

☐ 2 Days ☐ 3 Days

☒ Standard (7 Days)  
(TPH analysis 5 Days)

☐ \_\_\_\_\_ (other)

Laboratory Number:

**05-144**

Lab ID		Sample Identification	Date Sampled	Time Sampled	Matrix	Number	NAFTHA	NAFTHA	NAFTHA	NAFTHA	Volatiles	Halogens	Semivolatiles (with toluene)	PAHs 66	MEL	PCBs 28	Organochlorine	Organophosphorus	Chlorinated	Total PC	Total MH	TCLP M	HEM test							% Moisture
11		14-AREPL-4GMW-13-GW	5/15	1310	GW	3					X																			
12		14-AREPL-4GMW-14-GW	5/15	1448	GW	3					X																			
13		14-AREPL-4GMW-15-GW	5/15	1054	GW	16	X	X	X	X	X	X			X															
14		14-AREPL-MW80-GW	5/14	1250	GW	3					X																			
15		14-AREPL-MW60-GW	5/13	1708	GW	3					X																			
16		14-AREPL-TB	5/13	0900	GW	2					X																			

Signature	Company	Date	Time	Comments/Special Instructions
<u>[Signature]</u>	<u>Ah</u>	<u>5/16/14</u>	<u>1415</u>	
<u>[Signature]</u>	<u>OnSite Env</u>	<u>5/17/14</u>	<u>1410</u>	
Relinquished				
Received				
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date	Reviewed/Date	Chromatograms with final report <input type="checkbox"/>		

## Certificate of Analysis: Gene-Trac® *Dehalococcoides* Assay

**Customer:** Olga Stewart, Ahtna Engineering

**Project:** AK Real Estate

**Customer Reference:** 20266.008.01.02

**SiREM Reference:** S-3215

**Report Date:** 2-Jun-14

**Data Files:** iQ5-DHC-QPCR-1114  
iQ5-DB-DHC-QPCR-0471  
iQ5-TBA-QPCR-0046

**Table 1: Test Results**

Customer Sample ID	SiREM Sample ID	Sample Collection Date	Sample Matrix	Percent Dhc *	<i>Dehalococcoides</i> Enumeration/Liter **
14-AREPL-MW-5-GW	DHC-10436	14-May-14	Groundwater	NA	4 x 10 <sup>3</sup> U
14-AREPL-MW-28-GW	DHC-10437	14-May-14	Groundwater	0.04 - 0.1 %	1 x 10 <sup>6</sup>
14-AREPL-MW-6-GW	DHC-10438	13-May-14	Groundwater	NA	3 x 10 <sup>3</sup> U

**Notes:**

\* Percent *Dehalococcoides* (Dhc) in microbial population. This value is calculated by dividing the number of Dhc 16S ribosomal ribonucleic acid (rRNA) gene copies by the total number of bacteria as estimated by the mass of DNA extracted from the sample. Range represents normal variation in Dhc enumeration.

\*\* Based on quantification of Dhc 16S rRNA gene copies. Dhc are generally reported to contain one 16S rRNA gene copy per cell; therefore, this number is often interpreted to represent the number of Dhc cells present in the sample.

J The associated value is an estimated quantity between the method detection limit and quantitation limit.

U Not detected, associated value is the quantification limit.

B Analyte was detected in the method blank within an order of magnitude of the test sample

NA Not applicable as *Dehalococcoides* not detected and/or quantifiable DNA not extracted from the sample.

I Sample inhibited the test reaction based on inability to PCR amplify extracted DNA with universal primers.

E Extracted genomic DNA was not detected in sample.

**Analyst:**



**Jennifer Wilkinson**  
Senior Laboratory Technician

**Approved:**



**Ximena Druar, B.Sc.**  
Genetic Testing Coordinator

**Table 2: Detailed Test Parameters, Gene-Trac Test Reference S-3215**

<b>Customer Sample ID</b>	14-AREPL-MW-5-GW	14-AREPL-MW-28-GW	14-AREPL-MW-6-GW
<b>SiREM Dhc Sample ID</b>	DHC-10436	DHC-10437	DHC-10438
<b>Date Received</b>	20-May-14	20-May-14	20-May-14
<b>Sample Temperature</b>	2 °C	2 °C	2 °C
<b>Filtration Date</b>	21-May-14	21-May-14	21-May-14
<b>Volume Used for DNA Extraction</b>	300 mL	300 mL	500 mL
<b>DNA Extraction Date</b>	21-May-14	21-May-14	21-May-14
<b>DNA Concentration in Sample (extractable)</b>	5165 ng/L	5815 ng/L	4993 ng/L
<b>PCR Amplifiable DNA</b>	Detected	Detected	Detected
<b>Dhc qPCR Date Analyzed</b>	22-May-14	22-May-14	22-May-14
<b>Laboratory Controls (see Table 3)</b>	Passed	Passed	Passed
<b>Comments</b>	--	--	--

**Notes:**

Refer to Table 3 for detailed results of controls.

°C = degrees Celsius

DNA = Deoxyribonucleic acid

PCR = polymerase chain reaction

qPCR = quantitative PCR

Dhc = *Dehalococcoides*

ng/L = nanograms per liter

mL = milliliters



**Table 3: Gene-Trac Dhc Control Results, Test Reference S-3215**

Laboratory Control	Analysis Date	Control Description	Spiked Dhc 16S rRNA Gene Copies per Liter	Recovered Dhc 16S rRNA Gene Copies per Liter	Comments
<b>Positive Control Low Concentration</b>	22-May-14	qPCR with KB1 genomic DNA (CSLD-0752)	$1.1 \times 10^5$	$7.2 \times 10^4$	--
<b>Positive Control High Concentration</b>	22-May-14	qPCR with KB1 genomic DNA (CSHD-0752)	$1.4 \times 10^7$	$1.3 \times 10^7$	--
<b>DNA Extraction Blank</b>	22-May-14	DNA extraction sterile water (FB-2190)	0	$2.6 \times 10^3$ U	--
<b>Negative Control</b>	22-May-14	Tris Reagent Blank (TBD-0711)	0	$2.6 \times 10^3$ U	--

**Notes:**

Dhc = *Dehalococcoides*

DNA = Deoxyribonucleic acid

qPCR = quantitative PCR

16S rRNA = 16S ribosomal ribonucleic acid

U Not detected, associated value is the quantification limit.

Project Name <u>AK Real Estate</u>		Project # <u>20266.008.01.02</u>		Analysis															
Project Manager <u>Olga Stewart</u>				Preservative <u>0</u>															
Email Address <u>ostewart@ahtra.net</u>				<div style="display: flex;"> <div style="flex: 1;"> <p>Gene-Trac Dhc</p> <p>Gene-Trac VC</p> <p>Gene-Trac Dtb</p> </div> <div style="flex: 1;"> <p>Preservative Key</p> <p>0. None</p> <p>1. HCl</p> <p>2. Other _____</p> <p>3. Other _____</p> </div> </div>															
Company <u>Ahtra Engineering</u>																			
Address <u>110 W 38th Ave Suite 200A</u>																			
Phone # <u>907 646 2969</u>		Fax # _____																	
Sampler's Signature <u>[Signature]</u>		Sampler's Printed Name <u>Alex Geilich</u>																	
Customer Sample ID		Sampling		Matrix		# of Containers		Other Information											
		Date	Time																
<u>14-AREPL-MW-5-GW</u>		<u>5/14/14</u>	<u>1753</u>	<u>GW</u>		<u>1</u>		<u>B-00910</u>											
<u>14-AREPL-MW-28-GW</u>		<u>5/14/14</u>	<u>1610</u>	<u>GW</u>		<u>1</u>		<u>B-00909</u>											
<u>14-AREPL-MW-6-GW</u>		<u>5/13/14</u>	<u>1708</u>	<u>GW</u>		<u>1</u>		<u>B-00908</u>											

Cooler Condition: <u>GOOD</u>		P.O. # _____		Turnaround Time Requested		For Lab Use Only	
Cooler Temperature: <u>20C</u>		Billing Information		Normal <input checked="" type="checkbox"/>			
Custody Seals: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		Bill To: _____		Rush <input type="checkbox"/>			
						Proposal #: _____	

Relinquished By:		Received By:		Relinquished By:		Received By:		Relinquished By:		Received By:	
Signature <u>[Signature]</u>		Signature <u>[Signature]</u>		Signature _____		Signature _____		Signature _____		Signature _____	
Printed Name <u>Emily Freitas</u>		Printed Name <u>D. Nespoli</u>		Printed Name _____		Printed Name _____		Printed Name _____		Printed Name _____	
Firm <u>Ahtra Engineering</u>		Firm <u>SiREM</u>		Firm _____		Firm _____		Firm _____		Firm _____	
Date/Time <u>5/19/14 9:21</u>		Date/Time <u>MAY 20 14 2:30pm</u>		Date/Time _____		Date/Time _____		Date/Time _____		Date/Time _____	

## Certificate of Analysis: Gene-Trac® VC, Vinyl Chloride Reductase (*vcrA*) Assay

**Customer:** Olga Stewart, Ahtna Engineering

**Project:** AK Real Estate

**Customer Reference:** 20266.008.01.02

**SiREM Reference:** S-3215

**Report Date:** 7/4/2014

**Data Files:** MyiQ-VC-QPCR-0669  
VC-QPCR-check-gel-0671  
MyiQ-DB-VC-QPCR-0388

**Table 1b: Test Results**

Customer Sample ID	SiREM Sample ID	Sample Collection Date	Sample Matrix	Percent <i>vcrA</i> *	Vinyl Chloride Reductase ( <i>vcrA</i> ) Gene Copies/Liter
14-AREPL-MW-28-GW	VCR-4886	14-May-14	Groundwater	0.01 - 0.04 %	4 x 10 <sup>5</sup>

**Notes:**

\* Percent *vcrA* in microbial population. This value is calculated by dividing the number of vinyl chloride reductase A (*vcrA*) gene copies quantified by the total number of bacteria estimated to be in the sample based on the mass of DNA extracted from the sample. Range represents normal variation in enumeration of *vcrA*.

J The associated value is an estimated quantity between the method detection limit and quantitation limit.

U Not detected, associated value is the quantification limit.

B Analyte was detected in the method blank within an order of magnitude of the test sample.

NA Not applicable as *vcrA* not detected and/or quantifiable DNA not extracted from the sample.

I Sample inhibited the test reaction based on inability to PCR amplify extracted DNA with universal primers.

C Correction factor applied to correct for non-specific PCR amplification products, value is an estimated quantity.

**Analyst:**   
**Ben Reside**  
Laboratory Technician

**Approved:**   
**Phil Dennis, M.A.Sc.,**  
Senior Manager

**Table 2: Detailed Test Parameters, Gene-Trac Test Reference S-3215**

<b>Customer Sample ID</b>	14-AREPL-MW-5-GW	14-AREPL-MW-28-GW	14-AREPL-MW-6-GW
<b>SiREM Dhc Sample ID</b>	DHC-10436	DHC-10437	DHC-10438
<b>SiREM <i>vcrA</i> Sample ID</b>	N/A	VCR-4886	N/A
<b>Date Received</b>	20-May-14	20-May-14	20-May-14
<b>Sample Temperature</b>	2 °C	2 °C	2 °C
<b>Filtration Date</b>	21-May-14	21-May-14	21-May-14
<b>Volume Used for DNA Extraction</b>	300 mL	300 mL	500 mL
<b>DNA Extraction Date</b>	21-May-14	21-May-14	21-May-14
<b>DNA Concentration in Sample (extractable)</b>	5165 ng/L	5815 ng/L	4992.5 ng/L
<b>PCR Amplifiable DNA</b>	Detected	Detected	Detected
<b>Dhc qPCR Date Analyzed</b>	22-May-14	22-May-14	22-May-14
<b><i>vcrA</i> qPCR Date Analyzed</b>	N/A	2-Jul-14	N/A
<b>Laboratory Controls (see Tables 3 &amp; 4)</b>	Passed	Passed	Passed
<b>Comments</b>	--	--	--

**Notes:**

Refer to Tables 3 & 4 for detailed results of controls.

°C = degrees Celsius

N/A = not applicable

PCR = polymerase chain reaction

qPCR = quantitative PCR

Dhc = *Dehalococcoides*

*vcrA* = vinyl chloride reductase

ng/L = nanograms per liter

mL = milliliters

DNA = Deoxyribonucleic acid

**Table 4: Gene-Trac VC Control Results, Test Reference S-3215**

Laboratory Control	Analysis Date	Control Description	Spiked <i>vcrA</i> reductase Gene Copies per Liter	Recovered <i>vcrA</i> reductase Gene Copies per Liter	Comments
Positive Control Low Concentration	2-Jul-14	qPCR with KB1 genomic DNA (CSLV-0537)	$9.5 \times 10^4$	$1.3 \times 10^5$	--
Positive Control High Concentration	2-Jul-14	qPCR with KB1 genomic DNA (CSHV-0537)	$9.6 \times 10^6$	$1.1 \times 10^7$	--
DNA Extraction Blank	22-May-14	DNA extraction sterile water (FB-2190)	0	$2.6 \times 10^3$ U	--
Negative Control	2-Jul-14	Tris Reagent Blank (TBV-0508)	0	$2.6 \times 10^3$ U	--

**Notes:**

DNA = Deoxyribonucleic acid

qPCR = quantitative PCR

16S rRNA = 16S ribosomal ribonucleic acid

U Not detected, associated value is the quantification limit.

*vcrA* = vinyl chloride reductase

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Client Ahtna Engineering Services  
110 W. 38th Ave, 200A  
Anchorage, AK 99503  
Project AK Real Estate  
Project # 20266.008.01.02  
Report to Olga Stewart  
Tel: 907.865.3865  
Email: ostewart@ahna.net

PACE Analytical  
220 William Pitt Way  
Pittsburgh, PA 15238  
Tel: 412.826.5245  
Report by: Dr. Yi Wang  
Director, CSIA Center of Excellence  
Cell: 609.721.2843  
Email: yi.wang@zymaxusa.com

## REPORT OF ENVIRONMENTAL FORENSICS ISOTOPE ANALYSES

Date Received: 5/16/2014

Date Reported: 6/24/2014

Water samples submitted for  $\delta^{13}\text{C}$  (‰ PDB) and  $\delta^{37}\text{Cl}$  (‰ SMOC) ratios of dissolved tetrachloroethylene (PCE)

Pace CSIA	Sample	$\delta^{13}\text{C}$	$\delta^{37}\text{Cl}$
Lab Number	Description	PCE	PCE
P1405002-1	14-AREPL-MW5-GW	-34.07	0.40
P1405002-2	14-AREPL-MW28-GW	-36.34	-1.21
P1405002-3	14-AREPL-MW6-GW	-33.79	0.31
P1405002-4	14-AREPL-4GMW-15-GW	<sup>J</sup> -33.43	<sup>U</sup> -
Analytical Precision (1 $\sigma$ )		0.30	0.43

PCE: Tetrachloroethene

N/A: Sample had lower concentration of PCE - Not Analyze for 2D-CSIA Upon Client's Request

<sup>J</sup>-Target analyte produced a low peak signal and the result is considered usable to  $\pm 2\%$ , but not the standard  $\pm 0.5\%$

<sup>U</sup>-Either there was no peak corresponding to the target analyte or that such a peak did not produce a reliable CSIA result

Method: CSIA for  $^{13}\text{C}/^{12}\text{C}$  and D/H by GC-IRMS, for  $^{37}\text{Cl}/^{35}\text{Cl}$  by GC-qMS

CSIA: Compound Specific Isotope Analysis

GC-IRMS: Gas Chromatography-Isotope Ratio Mass Spectrometry

Quality Control STDs	$\delta^{13}\text{C}$	$\delta^{37}\text{Cl}$
	PCE	PCE
QC-1	-32.03	1.98
QC-2	-31.60	1.37
Mean	-31.82	1.68
Analytical Precision (1 $\sigma$ )	0.30	0.43

### Pace CSIA Forensic Isotope Services

Product or Dissolved Organics: Chlorinated Solvents, Oil, Extract, Fraction and Kerogen

3D-CSIA of  $^{13}\text{C}$ ,  $^{37}\text{Cl}$ , and  $^2\text{H}$  for PCE, TCE, DCE, MTBE, BTEX, PAHs, Pesticides, Alkanes, Gasoline and Oil; Bulk  $^{13}\text{C}$ ,  $^2\text{H}$ ,  $^{18}\text{O}$ ,  $^{34}\text{S}$ , and  $^{15}\text{N}$

Gas Sample

Gas Composition and 2D-CSIA of  $^{13}\text{C}$  and  $^2\text{H}$  of C1 to C5;  $^{13}\text{C}$  of  $\text{CO}_2$ ;  $^{14}\text{C}$  of C1 and  $\text{CO}_2$ ;  $^{34}\text{S}$  of  $\text{H}_2\text{S}$ ;  $^{15}\text{N}$  and  $^{18}\text{O}$  of  $\text{N}_2\text{O}$  gas

Water and Dissolved Inorganics

$^2\text{H}$ ,  $^3\text{H}$  and  $^{18}\text{O}$ ;  $^{34}\text{S}$  and  $^{18}\text{O}$  of dissolved sulfate;  $^{34}\text{S}$  of dissolved  $\text{H}_2\text{S}$

$^{15}\text{N}$  and  $^{18}\text{O}$  of dissolved Nitrate;  $^{15}\text{N}$  of Ammonia;  $^{13}\text{C}$  of dissolved  $\text{CO}_2$  and Carbonate/Bicarbonate

Soil and Minerals

$^{13}\text{C}$ ,  $^{18}\text{O}$ ,  $^{15}\text{N}$ ,  $^{34}\text{S}$ , D/H;  $^{14}\text{C}$  of carbonate or organics

Post-Analysis Forensic Isotope Data Interpretation

NON-CONFORMANCE FORM

Microseeps Project Number: P1405002

Date: 5.19.14 Time of Receipt: 0830 Receiver: LY

Client: Ahtna

REASON FOR NON-CONFORMANCE:

14- AREPL- MW6- GW: 5 vials had ID of  
14- AREPL- MW8- GW, with same date & time  
of collection.

ACTION TAKEN:

Client name: Olga Stewart Date: 5/19/14 Time: email

Per attached email - log all vials as 14-AREPL-MW6-GW.

Customer Service Initials: RR

Date: 5/19/14



## Robbin Robl

---

**From:** Olga Stewart <ostewart@ahtna.net>  
**Sent:** Monday, May 19, 2014 1:46 PM  
**To:** Robbin Robl  
**Cc:** Emily Freitas; Alexander Geilich  
**Subject:** RE: AK Real Estate / 20266.008.01.02  
**Attachments:** RE: Request for Quote for Ahtna Engineering Services for CSIA and dissolved gases analyses

P1405002

Hi Robin,

Glad to hear you got the samples. The sample ID 14-AREPL-MW6-GW is correct for reporting.

Thank you for the heads up on the extended turnaround time on Chlorine. If the lab is opening in June, will all the samples be processed in the order in which they were received during the closure? And if that is the case, when can we expect results? Are there alternatives for a quicker turnaround such as sending the samples through the university like done previously?

We are anticipating similar pricing to that which was given for Gaffney (attached). It would be good to have a quote specifically for this project.

Let me know if you have any further questions.

Thanks,

Olga

Olga Stewart, P.E.  
Environmental Engineer



Ahtna Engineering Services, LLC  
110 West 38th Avenue, Suite 200A, Anchorage, AK 99503  
907.646.2969 OF | 907.297.8039 CL | [ostewart@ahtna.net](mailto:ostewart@ahtna.net)

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---

**From:** Robbin Robl [<mailto:rrobl@microseeps.com>]  
**Sent:** Monday, May 19, 2014 9:24 AM  
**To:** Olga Stewart  
**Subject:** AK Real Estate / 20266.008.01.02  
**Importance:** High

Hi Olga,

We received samples today for your project AK Real Estate / 20266.008.01.02.

P1405882

I received a non-conformance for sample 14-AREPL-MW6-GW. Five (5) of the sample vials were received with a sample ID of 14-AREPL-MW8-GW. I would appreciate it if you can please tell me which sample ID is correct for reporting purposes.

I also wanted to let you know that there will be an extended turnaround time for the Chlorine isotope CSIA as we are moving our sister-lab ZymaX from Escondido, CA to our facility here in Pittsburgh, PA at the end of this month. They are hoping to be operational by the 2<sup>nd</sup> week of June.

Can you please tell me if you have spoken to anyone regarding pricing? If not, I will send you a price quote ASAP.

Thank you!  
Robbin

Robbin Robl  
Pace Analytical Energy Services, LLC  
220 William Pitt Way  
Pittsburgh, PA 15238  
Direct: 412-826-4483  
Fax: 412-826-3433  
Main: 412-826-5245

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# Cooler Receipt Form

Client Name: Ahtna Project: AK Real Estate Lab Work Order: P1405002  
/ 20266.008.01.02

**A. Shipping/Container Information** (circle appropriate response)

Courier: FedEx UPS USPS Client Other: \_\_\_\_\_ Air bill Present: Yes No

Tracking Number: 805586962392

Custody Seal on Cooler/Box Present: Yes No <sup>5/19/14</sup> Seals Intact: Yes No

Cooler/Box Packing Material: Bubble Wrap Absorbent Foam Other: \_\_\_\_\_

Type of Ice: Wet Blue None Ice Intact: Yes Melted

Cooler Temperature: 5°C Radiation Screened: Yes No Chain of Custody Present: Yes No

Comments: \_\_\_\_\_

**B. Laboratory Assignment/Log-in** (check appropriate response)

	YES	NO	N/A	Comment Reference non-Conformance
Chain of Custody properly filled out	✓			
Chain of Custody relinquished	✓			
Sampler Name & Signature on COC	✓			
Containers intact	✓			
Were samples in separate bags	✓			
Sample container labels match COC Sample name/date and time collected		✓		
Sufficient volume provided	✓			
Microseeps containers used	✓			
Are containers properly preserved for the requested testing? (as labeled)	✓			
If an unknown preservation state, were containers checked? Exception: VOA's coliform			✓	If yes, see pH form.
Was volume for dissolved testing field filtered, as noted on the COC? Was volume received in a preserved container?			✓	

Comments: \_\_\_\_\_

Cooler contents examined/received by: LY Date: 5/19/14

Project Manager Review: PR Date: 5/19/14



# Lab Project Summary

Page 1 of 2

**Lab Project Manager:** Robbin Robl  
**Lab Project Num:** P1405002  
**Client:** Ahtna Engineering Services  
110 W. 38th Street  
Suite 200A  
Anchorage, AK 99503  
907-868-8250  
**Phone:**  
**Fax:**  
**E-mail:**  
**Client Project Name:** AK Real Estate  
**Client Project Num:** 20266.008.01.02

**Received:** 5/19/2014 **Report Due:** 7/2/2014 **Lab Due:** 7/1/2014  
**Report Level:** Standard - Date and Analyst  
**Quote #:** Q14050002  
**Proj Mgr:** Olga Stewart

**Lab Project Comment:**

**Client Sample Name:** 14-AREPL-MW5-GW  
**Sample Number:** P1405002-01A  
**Sample Date/Time:** 5/14/2014 6:10:00PM  
**Sampled By:**  
**Container Description:** 40ml VOA  
**Container Color:** Clear  
**Container Composition:** Glass  
**Comment:**

**Container Volume:** 320.00 ml  
**Container Preservative:** HCL  
**Proposed Disposal Date:** 6/27/2014  
**Fraction Lab Created?** No  
**Client Spike Requested?** No  
**PH:**

Test Pkg Name	Method	Lab	Subcontract(or)
Carbon Isotope Analysis Chlorinated	AM24-DL_C	Pittsburgh	None
Carbon Isotope Area Chlorinated	AM24-AR_C	Pittsburgh	None
Co-elution Check _Chlorinated	8260B	Pittsburgh	None
VTCL	5030B/8260B	Pittsburgh	None

**Client Sample Name:** 14-AREPL-MW28-GW  
**Sample Number:** P1405002-02A  
**Sample Date/Time:** 5/14/2014 4:35:00PM  
**Sampled By:**  
**Container Description:** 40ml VOA  
**Container Color:** Clear  
**Container Composition:** Glass  
**Comment:**

**Container Volume:** 360.00 ml  
**Container Preservative:** HCL  
**Proposed Disposal Date:** 6/27/2014  
**Fraction Lab Created?** No  
**Client Spike Requested?** No  
**PH:**

Test Pkg Name	Method	Lab	Subcontract(or)
Carbon Isotope Analysis Chlorinated	AM24-DL_C	Pittsburgh	None
Carbon Isotope Area Chlorinated	AM24-AR_C	Pittsburgh	None
Co-elution Check _Chlorinated	8260B	Pittsburgh	None
VTCL	5030B/8260B	Pittsburgh	None

## Lab Project Summary

Page 2 of 2

**Lab Project Manager:** Robbin Robl

**Lab Project Num:** P1405002

**Received:** 5/19/2014 **Report Due:** 7/2/2014

**Lab Due:** 7/1/2014

**Client Sample Name:** 14-AREPL-MW6-GW  
**Sample Number:** P1405002-03A  
**Sample Date/Time:** 5/13/2014 5:08:00PM  
**Sampled By:**  
**Container Description:** 40ml VOA  
**Container Color:** Clear  
**Container Composition:** Glass  
**Comment:**

**Container Volume:** 360.00 ml  
**Container Preservative:** HCL  
**Proposed Disposal Date:** 6/27/2014  
**Fraction Lab Created?** No  
**Client Spike Requested?** No  
**PH:**

Test Pkg Name	Method	Lab	Subcontract(or)
Carbon Isotope Analysis Chlorinated	AM24-DL_C	Pittsburgh	None
Carbon Isotope Area Chlorinated	AM24-AR_C	Pittsburgh	None
Co-elution Check _Chlorinated	8260B	Pittsburgh	None
VTCL	5030B/8260B	Pittsburgh	None

**Client Sample Name:** 14-AREPL-4GMW-15-GW  
**Sample Number:** P1405002-04A  
**Sample Date/Time:** 5/15/2014 10:54:00AM  
**Sampled By:**  
**Container Description:** 40ml VOA  
**Container Color:** Clear  
**Container Composition:** Glass  
**Comment:**

**Container Volume:** 360.00 ml  
**Container Preservative:** HCL  
**Proposed Disposal Date:** 6/27/2014  
**Fraction Lab Created?** No  
**Client Spike Requested?** No  
**PH:**

Test Pkg Name	Method	Lab	Subcontract(or)
Carbon Isotope Analysis Chlorinated	AM24-DL_C	Pittsburgh	None
Carbon Isotope Area Chlorinated	AM24-AR_C	Pittsburgh	None
Co-elution Check _Chlorinated	8260B	Pittsburgh	None
VTCL	5030B/8260B	Pittsburgh	None

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Anchorage

2000 West International Airport Road

Suite A10

Anchorage, AK 99502-1119

Tel: (907)563-9200

TestAmerica Job ID: 230-108-1

Client Project/Site: Ahtna Engineering Services

For:

Ahtna Engineering Services LLC

560 E 34th Avenue

Suite 101

Anchorage, Alaska 99503

Attn: Olga Stewart

*Johanna S. Dreher*

Authorized for release by:

5/22/2014 12:03:20 PM

Johanna Dreher, Project Manager I

(907)563-9200

[johanna.dreher@testamericainc.com](mailto:johanna.dreher@testamericainc.com)

### LINKS

Review your project  
results through

TotalAccess

Have a Question?



Visit us at:

[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

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## Definitions/Glossary

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

### Qualifiers

#### GC VOA

Qualifier	Qualifier Description
X	Surrogate is outside control limits

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## Case Narrative

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

### Job ID: 230-108-1

#### Laboratory: TestAmerica Anchorage

#### Narrative

#### Job Narrative 230-108-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 5/9/2014 5:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 15.8° C. The samples were received one hour after collection.

#### Subcontract

VOCs by 8260 samples were subcontracted to TestAmerica Spokane from TestAmerica Anchorage.

#### GC VOA

Method(s) AK101: The following sample(s) required a dilution due to the nature of the sample matrix: (230-108-1 DU), (230-108-1 MS), (230-108-1 MSD), 14-AKRE-Cuttings (230-108-1). Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information.

Method(s) AK101: Surrogate recovery for the following sample(s) was outside control limits: (230-108-1 DU), (230-108-1 MS), (230-108-1 MSD), 14-AKRE-Cuttings (230-108-1).

Method(s) AK101: The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for batch 475 recovered outside control limits for the following surrogates: BFB.

Method(s) AK101: The following sample(s) required a dilution due to the nature of the sample matrix: (230-108-1 DU), (230-108-1 MS), (230-108-1 MSD), 14-AKRE-Cuttings (230-108-1). Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information. Re-analysis confirmed high TFT surrogate recovery.

No other analytical or quality issues were noted.

#### GC Semi VOA

Method(s) AK102 : The method blank for batch 461 contained DRO above the method detection limit. This target analyte concentration was less than the reporting limit (RL); therefore, re-extraction and/or re-analysis of samples was not performed.

No other analytical or quality issues were noted.

#### General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### VOCs by 8260

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### Organic Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



## Detection Summary

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

### Client Sample ID: 14-AKRE-Cuttings

### Lab Sample ID: 230-108-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type	
Gasoline Range Organics (GRO)	150		37	mg/Kg	1	☼	AK101	Total/NA	
-C6-C10									
C10-C25	6100		560	mg/Kg	20	☼	AK102 & 103	Total/NA	
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
n-Propylbenzene	0.644		0.388		mg/kg dry	10.0	☼	EPA 8260C	Total
1,2,4-Trimethylbenzene	1.57		0.388		mg/kg dry	10.0	☼	EPA 8260C	Total
sec-Butylbenzene	0.935		0.388		mg/kg dry	10.0	☼	EPA 8260C	Total
p-Isopropyltoluene	1.35		0.388		mg/kg dry	10.0	☼	EPA 8260C	Total
n-Butylbenzene	1.46		0.388		mg/kg dry	10.0	☼	EPA 8260C	Total

### Client Sample ID: 14-AKRE-TB

### Lab Sample ID: 230-108-2

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica Anchorage

# Client Sample Results

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

**Client Sample ID: 14-AKRE-Cuttings**

**Lab Sample ID: 230-108-1**

**Date Collected: 05/09/14 16:30**

**Matrix: Solid**

**Date Received: 05/09/14 17:00**

**Percent Solids: 93**

## Method: EPA 8260C - Volatile Organic Compounds by EPA Method 8260C

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Chloromethane	ND		0.116		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Vinyl chloride	ND		0.0310		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Bromomethane	ND		0.233		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Chloroethane	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Trichlorofluoromethane	ND		0.116		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
1,1-Dichloroethene	ND		0.116		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Carbon disulfide	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Methylene chloride	ND		0.776		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Acetone	ND		3.88		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
trans-1,2-Dichloroethene	ND		1.16		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Methyl tert-butyl ether	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
1,1-Dichloroethane	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
cis-1,2-Dichloroethene	ND		0.776		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
2,2-Dichloropropane	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Bromochloromethane	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Chloroform	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Carbon tetrachloride	ND		0.116		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
1,1,1-Trichloroethane	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
2-Butanone	ND		3.88		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
1,1-Dichloropropene	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Benzene	ND		0.0776		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
1,2-Dichloroethane (EDC)	ND		0.0582		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Trichloroethene	ND		0.0776		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Dibromomethane	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
1,2-Dichloropropane	ND		0.0388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Bromodichloromethane	ND		0.116		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
cis-1,3-Dichloropropene	ND		0.0776		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Toluene	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
4-Methyl-2-pentanone	ND		3.88		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
trans-1,3-Dichloropropene	ND		0.0776		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Tetrachloroethene	ND		0.0776		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
1,1,2-Trichloroethane	ND		0.0388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Dibromochloromethane	ND		0.116		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
1,3-Dichloropropane	ND		0.0776		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
1,2-Dibromoethane	ND		0.0194		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
2-Hexanone	ND		3.88		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Ethylbenzene	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Chlorobenzene	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
1,1,1,2-Tetrachloroethane	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
m,p-Xylene	ND		1.55		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
o-Xylene	ND		0.776		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Styrene	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Bromoform	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Isopropylbenzene	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
n-Propylbenzene	0.644		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
1,1,2,2-Tetrachloroethane	ND		0.0388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Bromobenzene	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
1,3,5-Trimethylbenzene	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0

TestAmerica Anchorage

# Client Sample Results

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

**Client Sample ID: 14-AKRE-Cuttings**

**Lab Sample ID: 230-108-1**

Date Collected: 05/09/14 16:30

Matrix: Solid

Date Received: 05/09/14 17:00

Percent Solids: 93

## Method: EPA 8260C - Volatile Organic Compounds by EPA Method 8260C (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chlorotoluene	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
1,2,3-Trichloropropane	ND		0.0388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
4-Chlorotoluene	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
tert-Butylbenzene	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
1,2,4-Trimethylbenzene	1.57		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
sec-Butylbenzene	0.935		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
p-Isopropyltoluene	1.35		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
1,3-Dichlorobenzene	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
1,4-Dichlorobenzene	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
n-Butylbenzene	1.46		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
1,2-Dichlorobenzene	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
1,2-Dibromo-3-chloropropane	ND		1.94		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Hexachlorobutadiene	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
1,2,4-Trichlorobenzene	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Naphthalene	ND		0.776		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
1,2,3-Trichlorobenzene	ND		0.388		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0
Xylenes (total)	ND		2.33		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:32	10.0

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane	98.6		42.4 - 163	05/13/14 13:08	05/13/14 15:32	10.0
Toluene-d8	95.3		45.8 - 155	05/13/14 13:08	05/13/14 15:32	10.0
4-bromofluorobenzene	151		41.5 - 162	05/13/14 13:08	05/13/14 15:32	10.0
a,a,a - Trifluorotoluene	118		50 - 150	05/13/14 13:08	05/13/14 15:32	10.0

## Method: AK101 - Alaska - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)	150		37	mg/Kg	☼	05/13/14 11:06	05/14/14 18:45	1
-C6-C10								

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene (fid)	261	X	50 - 150	05/13/14 11:06	05/14/14 18:45	1
BFB - FID	118		50 - 150	05/13/14 11:06	05/14/14 18:45	1

## Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C25	6100		560	mg/Kg	☼	05/12/14 12:00	05/14/14 13:45	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctadecane	58		50 - 150	05/12/14 12:00	05/14/14 13:45	20

**Client Sample ID: 14-AKRE-TB**

**Lab Sample ID: 230-108-2**

Date Collected: 05/09/14 16:00

Matrix: Solid

Date Received: 05/09/14 17:00

Percent Solids: 100

## Method: EPA 8260C - Volatile Organic Compounds by EPA Method 8260C

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Chloromethane	ND		0.0300		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Vinyl chloride	ND		0.00800		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Bromomethane	ND		0.0600		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Chloroethane	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00

TestAmerica Anchorage

# Client Sample Results

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

**Client Sample ID: 14-AKRE-TB**

**Lab Sample ID: 230-108-2**

**Date Collected: 05/09/14 16:00**

**Matrix: Solid**

**Date Received: 05/09/14 17:00**

**Percent Solids: 100**

## Method: EPA 8260C - Volatile Organic Compounds by EPA Method 8260C (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichlorofluoromethane	ND		0.0300		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
1,1-Dichloroethene	ND		0.0300		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Carbon disulfide	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Methylene chloride	ND		0.200		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Acetone	ND		1.00		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
trans-1,2-Dichloroethene	ND		0.300		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Methyl tert-butyl ether	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
1,1-Dichloroethane	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
cis-1,2-Dichloroethene	ND		0.200		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
2,2-Dichloropropane	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Bromochloromethane	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Chloroform	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Carbon tetrachloride	ND		0.0300		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
1,1,1-Trichloroethane	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
2-Butanone	ND		1.00		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
1,1-Dichloropropene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Benzene	ND		0.0200		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
1,2-Dichloroethane (EDC)	ND		0.0150		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Trichloroethene	ND		0.0200		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Dibromomethane	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
1,2-Dichloropropane	ND		0.0100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Bromodichloromethane	ND		0.0300		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
cis-1,3-Dichloropropene	ND		0.0200		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Toluene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
4-Methyl-2-pentanone	ND		1.00		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
trans-1,3-Dichloropropene	ND		0.0200		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Tetrachloroethene	ND		0.0200		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
1,1,2-Trichloroethane	ND		0.0100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Dibromochloromethane	ND		0.0300		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
1,3-Dichloropropane	ND		0.0200		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
1,2-Dibromoethane	ND		0.00500		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
2-Hexanone	ND		1.00		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Ethylbenzene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Chlorobenzene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
1,1,1,2-Tetrachloroethane	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
m,p-Xylene	ND		0.400		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
o-Xylene	ND		0.200		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Styrene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Bromoform	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Isopropylbenzene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
n-Propylbenzene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
1,1,2,2-Tetrachloroethane	ND		0.0100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Bromobenzene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
1,3,5-Trimethylbenzene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
2-Chlorotoluene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
1,2,3-Trichloropropane	ND		0.0100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
4-Chlorotoluene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
tert-Butylbenzene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
1,2,4-Trimethylbenzene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00

TestAmerica Anchorage

# Client Sample Results

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

**Client Sample ID: 14-AKRE-TB**

**Lab Sample ID: 230-108-2**

**Date Collected: 05/09/14 16:00**

**Matrix: Solid**

**Date Received: 05/09/14 17:00**

**Percent Solids: 100**

## Method: EPA 8260C - Volatile Organic Compounds by EPA Method 8260C (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
sec-Butylbenzene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
p-Isopropyltoluene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
1,3-Dichlorobenzene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
1,4-Dichlorobenzene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
n-Butylbenzene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
1,2-Dichlorobenzene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
1,2-Dibromo-3-chloropropane	ND		0.500		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Hexachlorobutadiene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
1,2,4-Trichlorobenzene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Naphthalene	ND		0.200		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
1,2,3-Trichlorobenzene	ND		0.100		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00
Xylenes (total)	ND		0.600		mg/kg dry	☼	05/13/14 13:08	05/13/14 15:55	1.00

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane	99.9		42.4 - 163	05/13/14 13:08	05/13/14 15:55	1.00
Toluene-d8	100		45.8 - 155	05/13/14 13:08	05/13/14 15:55	1.00
4-bromofluorobenzene	104		41.5 - 162	05/13/14 13:08	05/13/14 15:55	1.00
a,a,a - Trifluorotoluene	93.2		50 - 150	05/13/14 13:08	05/13/14 15:55	1.00

## Method: AK101 - Alaska - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	ND		3.3	mg/Kg	☼	05/13/14 11:06	05/13/14 16:54	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene (fid)	103		50 - 150	05/13/14 11:06	05/13/14 16:54	1
BFB - FID	116		50 - 150	05/13/14 11:06	05/13/14 16:54	1

## Surrogate Summary

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

### Method: EPA 8260C - Volatile Organic Compounds by EPA Method 8260C

Matrix: Soil

Prep Type: Total

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		DBFM (42.4-163)	Toluene-d8 (45.8-155)	BFB (41.5-162)	Trifluorotc (50-150)
14E0066-BLK1	Method Blank	94.9	99.1	101	115
<b>Surrogate Legend</b>					
DBFM = Dibromofluoromethane					
Toluene-d8 = Toluene-d8					
BFB = 4-bromofluorobenzene					
a,a,a - Trifluorotoluene = a,a,a - Trifluorotoluene					

### Method: EPA 8260C - Volatile Organic Compounds by EPA Method 8260C

Matrix: Soil

Prep Type: Total

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		DBFM (42.4-163)	Toluene-d8 (45.8-155)	BFB (41.5-162)	Trifluorotc (60-120)
14E0066-BS1	Lab Control Sample	102	99.2	101	103
14E0066-BSD1	Lab Control Sample Dup	102	101	101	104
<b>Surrogate Legend</b>					
DBFM = Dibromofluoromethane					
Toluene-d8 = Toluene-d8					
BFB = 4-bromofluorobenzene					
a,a,a - Trifluorotoluene = a,a,a - Trifluorotoluene					

### Method: EPA 8260C - Volatile Organic Compounds by EPA Method 8260C

Matrix: Solid

Prep Type: Total

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		DBFM (42.4-163)	Toluene-d8 (45.8-155)	BFB (41.5-162)	Trifluorotc (50-150)
230-108-1	14-AKRE-Cuttings	98.6	95.3	151	118
230-108-2	14-AKRE-TB	99.9	100	104	93.2
<b>Surrogate Legend</b>					
DBFM = Dibromofluoromethane					
Toluene-d8 = Toluene-d8					
BFB = 4-bromofluorobenzene					
a,a,a - Trifluorotoluene = a,a,a - Trifluorotoluene					

### Method: AK101 - Alaska - Gasoline Range Organics (GC)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)	
		TFT2 (50-150)	BFB - FID2 (50-150)
230-108-1	14-AKRE-Cuttings	261 X	118
230-108-1 DU	14-AKRE-Cuttings	255 X	132
230-108-1 MS	14-AKRE-Cuttings	451 X	142
230-108-1 MSD	14-AKRE-Cuttings	422 X	131
230-108-2	14-AKRE-TB	103	116
LCS 230-471/4-A	Lab Control Sample	122	128

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## Surrogate Summary

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

### Method: AK101 - Alaska - Gasoline Range Organics (GC) (Continued)

Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	TFT2 (50-150)	BFB - FID2 (50-150)
LCS 230-482/4-A	Lab Control Sample	86	110
LCSD 230-471/5-A	Lab Control Sample Dup	131	125
LCSD 230-482/5-A	Lab Control Sample Dup	114	108
MB 230-471/1-A	Method Blank	108	105
MB 230-482/1-A	Method Blank	105	107
<b>Surrogate Legend</b>			
TFT = a,a,a-Trifluorotoluene (fid)			
BFB - FID = BFB - FID			

### Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)

Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	1COD (50-150)	
230-108-1	14-AKRE-Cuttings	58	
230-109-A-1-B DU	Duplicate	75	
230-109-A-1-C MS	Matrix Spike	82	
230-109-A-1-D MSD	Matrix Spike Duplicate	80	
LCS 230-461/2-A	Lab Control Sample	73	
LCSD 230-461/3-A	Lab Control Sample Dup	75	
MB 230-461/1-A	Method Blank	71	
<b>Surrogate Legend</b>			
1COD = 1-Chlorooctadecane			

# QC Sample Results

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

## Method: EPA 8260C - Volatile Organic Compounds by EPA Method 8260C

Lab Sample ID: 14E0066-BLK1

Matrix: Soil

Analysis Batch: 14E0066

Client Sample ID: Method Blank

Prep Type: Total

Prep Batch: 14E0066\_P

Analyte	Blank Result	Blank Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Chloromethane	ND		0.0300		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Vinyl chloride	ND		0.00800		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Bromomethane	ND		0.0600		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Chloroethane	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Trichlorofluoromethane	ND		0.0300		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
1,1-Dichloroethene	ND		0.0300		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Carbon disulfide	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Methylene chloride	ND		0.200		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Acetone	ND		1.00		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
trans-1,2-Dichloroethene	ND		0.300		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Methyl tert-butyl ether	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
1,1-Dichloroethane	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
cis-1,2-Dichloroethene	ND		0.200		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
2,2-Dichloropropane	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Bromochloromethane	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Chloroform	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Carbon tetrachloride	ND		0.0300		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
1,1,1-Trichloroethane	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
2-Butanone	ND		1.00		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
1,1-Dichloropropene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Benzene	ND		0.0200		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
1,2-Dichloroethane (EDC)	ND		0.0150		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Trichloroethene	ND		0.0200		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Dibromomethane	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
1,2-Dichloropropane	ND		0.0100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Bromodichloromethane	ND		0.0300		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
cis-1,3-Dichloropropene	ND		0.0200		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Toluene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
4-Methyl-2-pentanone	ND		1.00		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
trans-1,3-Dichloropropene	ND		0.0200		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Tetrachloroethene	ND		0.0200		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
1,1,2-Trichloroethane	ND		0.0100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Dibromochloromethane	ND		0.0300		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
1,3-Dichloropropane	ND		0.0200		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
1,2-Dibromoethane	ND		0.00500		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
2-Hexanone	ND		1.00		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Ethylbenzene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Chlorobenzene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
1,1,1,2-Tetrachloroethane	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
m,p-Xylene	ND		0.400		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
o-Xylene	ND		0.200		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Styrene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Bromoform	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Isopropylbenzene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
n-Propylbenzene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
1,1,2,2-Tetrachloroethane	ND		0.0100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Bromobenzene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00

TestAmerica Anchorage

# QC Sample Results

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

## Method: EPA 8260C - Volatile Organic Compounds by EPA Method 8260C (Continued)

Lab Sample ID: 14E0066-BLK1

Matrix: Soil

Analysis Batch: 14E0066

Client Sample ID: Method Blank

Prep Type: Total

Prep Batch: 14E0066\_P

Analyte	Blank Result	Blank Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
2-Chlorotoluene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
1,2,3-Trichloropropane	ND		0.0100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
4-Chlorotoluene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
tert-Butylbenzene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
1,2,4-Trimethylbenzene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
sec-Butylbenzene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
p-Isopropyltoluene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
1,3-Dichlorobenzene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
1,4-Dichlorobenzene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
n-Butylbenzene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
1,2-Dichlorobenzene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
1,2-Dibromo-3-chloropropane	ND		0.500		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Hexachlorobutadiene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
1,2,4-Trichlorobenzene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Naphthalene	ND		0.200		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
1,2,3-Trichlorobenzene	ND		0.100		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00
Xylenes (total)	ND		0.600		mg/kg wet		05/13/14 13:08	05/13/14 13:19	1.00

Surrogate	Blank %Recovery	Blank Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane	94.9		42.4 - 163	05/13/14 13:08	05/13/14 13:19	1.00
Toluene-d8	99.1		45.8 - 155	05/13/14 13:08	05/13/14 13:19	1.00
4-bromofluorobenzene	101		41.5 - 162	05/13/14 13:08	05/13/14 13:19	1.00
a,a,a - Trifluorotoluene	115		50 - 150	05/13/14 13:08	05/13/14 13:19	1.00

Lab Sample ID: 14E0066-BS1

Matrix: Soil

Analysis Batch: 14E0066

Client Sample ID: Lab Control Sample

Prep Type: Total

Prep Batch: 14E0066\_P

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dichlorodifluoromethane	0.500	0.454		mg/kg wet		90.7	60 - 140
Chloromethane	0.500	0.474		mg/kg wet		94.7	60 - 140
Vinyl chloride	0.500	0.532		mg/kg wet		106	60 - 140
Bromomethane	0.500	0.468		mg/kg wet		93.6	60 - 140
Chloroethane	0.500	0.464		mg/kg wet		92.9	60 - 140
Trichlorofluoromethane	0.500	0.499		mg/kg wet		99.8	60 - 140
1,1-Dichloroethene	0.500	0.494		mg/kg wet		98.7	76 - 187
Carbon disulfide	0.500	0.484		mg/kg wet		96.9	60 - 140
Methylene chloride	0.500	0.428		mg/kg wet		85.6	60 - 140
Acetone	2.50	1.92		mg/kg wet		76.8	60 - 140
trans-1,2-Dichloroethene	0.500	0.486		mg/kg wet		97.3	60 - 140
Methyl tert-butyl ether	0.500	0.454		mg/kg wet		90.8	79 - 127
1,1-Dichloroethane	0.500	0.497		mg/kg wet		99.4	60 - 140
cis-1,2-Dichloroethene	0.500	0.499		mg/kg wet		99.8	60 - 140
2,2-Dichloropropane	0.500	0.490		mg/kg wet		97.9	60 - 140
Bromochloromethane	0.500	0.519		mg/kg wet		104	60 - 140
Chloroform	0.500	0.527		mg/kg wet		105	60 - 140
Carbon tetrachloride	0.500	0.470		mg/kg wet		94.1	60 - 140

TestAmerica Anchorage

# QC Sample Results

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

## Method: EPA 8260C - Volatile Organic Compounds by EPA Method 8260C (Continued)

Lab Sample ID: 14E0066-BS1

Matrix: Soil

Analysis Batch: 14E0066

Client Sample ID: Lab Control Sample

Prep Type: Total

Prep Batch: 14E0066\_P

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	0.500	0.504		mg/kg wet		101	60 - 140
2-Butanone	2.50	2.13		mg/kg wet		85.1	60 - 140
1,1-Dichloropropene	0.500	0.492		mg/kg wet		98.3	60 - 140
Benzene	0.500	0.502		mg/kg wet		100	75.9 - 123
1,2-Dichloroethane (EDC)	0.500	0.510		mg/kg wet		102	60 - 140
Trichloroethene	0.500	0.520		mg/kg wet		104	82.7 - 120
Dibromomethane	0.500	0.480		mg/kg wet		96.1	60 - 140
1,2-Dichloropropane	0.500	0.492		mg/kg wet		98.5	60 - 140
Bromodichloromethane	0.500	0.536		mg/kg wet		107	60 - 140
cis-1,3-Dichloropropene	0.500	0.486		mg/kg wet		97.2	60 - 140
Toluene	0.500	0.486		mg/kg wet		97.1	77.3 - 126
4-Methyl-2-pentanone	2.50	2.20		mg/kg wet		88.1	60 - 140
trans-1,3-Dichloropropene	0.500	0.431		mg/kg wet		86.2	60 - 140
Tetrachloroethene	0.500	0.480		mg/kg wet		95.9	75 - 130
1,1,2-Trichloroethane	0.500	0.482		mg/kg wet		96.4	60 - 140
Dibromochloromethane	0.500	0.512		mg/kg wet		102	60 - 140
1,3-Dichloropropane	0.500	0.506		mg/kg wet		101	60 - 140
1,2-Dibromoethane	0.500	0.466		mg/kg wet		93.1	60 - 140
2-Hexanone	2.50	2.19		mg/kg wet		87.6	60 - 140
Ethylbenzene	0.500	0.460		mg/kg wet		92.0	80.7 - 120
Chlorobenzene	0.500	0.491		mg/kg wet		98.2	80 - 120
1,1,1,2-Tetrachloroethane	0.500	0.520		mg/kg wet		104	60 - 140
m,p-Xylene	0.500	0.480		mg/kg wet		96.1	86.1 - 120
o-Xylene	0.500	0.486		mg/kg wet		97.2	85.3 - 120
Styrene	0.500	0.468		mg/kg wet		93.6	60 - 140
Bromoform	0.500	0.470		mg/kg wet		94.0	60 - 140
Isopropylbenzene	0.500	0.482		mg/kg wet		96.3	60 - 140
n-Propylbenzene	0.500	0.481		mg/kg wet		96.2	60 - 140
1,1,2,2-Tetrachloroethane	0.500	0.486		mg/kg wet		97.1	60 - 140
Bromobenzene	0.500	0.486		mg/kg wet		97.3	60 - 140
1,3,5-Trimethylbenzene	0.500	0.483		mg/kg wet		96.6	60 - 140
2-Chlorotoluene	0.500	0.478		mg/kg wet		95.7	60 - 140
1,2,3-Trichloropropane	0.500	0.479		mg/kg wet		95.8	60 - 140
4-Chlorotoluene	0.500	0.512		mg/kg wet		102	60 - 140
tert-Butylbenzene	0.500	0.516		mg/kg wet		103	60 - 140
1,2,4-Trimethylbenzene	0.500	0.475		mg/kg wet		95.0	60 - 140
sec-Butylbenzene	0.500	0.470		mg/kg wet		94.0	60 - 140
p-Isopropyltoluene	0.500	0.460		mg/kg wet		92.0	60 - 140
1,3-Dichlorobenzene	0.500	0.484		mg/kg wet		96.8	60 - 140
1,4-Dichlorobenzene	0.500	0.466		mg/kg wet		93.3	60 - 140
n-Butylbenzene	0.500	0.474		mg/kg wet		94.7	60 - 140
1,2-Dichlorobenzene	0.500	0.486		mg/kg wet		97.3	60 - 140
1,2-Dibromo-3-chloropropane	0.500	0.490		mg/kg wet		98.1	60 - 140
Hexachlorobutadiene	0.500	0.479		mg/kg wet		95.8	60 - 140
1,2,4-Trichlorobenzene	0.500	0.464		mg/kg wet		92.7	60 - 140
Naphthalene	0.500	0.456		mg/kg wet		91.1	58.8 - 130
1,2,3-Trichlorobenzene	0.500	0.472		mg/kg wet		94.4	60 - 140

TestAmerica Anchorage

# QC Sample Results

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

## Method: EPA 8260C - Volatile Organic Compounds by EPA Method 8260C (Continued)

Lab Sample ID: 14E0066-BS1

Matrix: Soil

Analysis Batch: 14E0066

Client Sample ID: Lab Control Sample

Prep Type: Total

Prep Batch: 14E0066\_P

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Dibromofluoromethane	102		42.4 - 163
Toluene-d8	99.2		45.8 - 155
4-bromofluorobenzene	101		41.5 - 162
a,a,a - Trifluorotoluene	103		60 - 120

Lab Sample ID: 14E0066-BSD1

Matrix: Soil

Analysis Batch: 14E0066

Client Sample ID: Lab Control Sample Dup

Prep Type: Total

Prep Batch: 14E0066\_P

Analyte	Spike Added	LCS Dup Result	LCS Dup Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dichlorodifluoromethane	0.500	0.435		mg/kg wet		87.0	60 - 140	4.16	25
Chloromethane	0.500	0.470		mg/kg wet		93.9	60 - 140	0.848	25
Vinyl chloride	0.500	0.542		mg/kg wet		108	60 - 140	1.68	25
Bromomethane	0.500	0.442		mg/kg wet		88.5	60 - 140	5.60	25
Chloroethane	0.500	0.498		mg/kg wet		99.5	60 - 140	6.86	25
Trichlorofluoromethane	0.500	0.497		mg/kg wet		99.4	60 - 140	0.402	25
1,1-Dichloroethene	0.500	0.485		mg/kg wet		97.0	76 - 187	1.74	25
Carbon disulfide	0.500	0.478		mg/kg wet		95.7	60 - 140	1.25	25
Methylene chloride	0.500	0.430		mg/kg wet		85.9	60 - 140	0.350	25
Acetone	2.50	1.77		mg/kg wet		70.9	60 - 140	8.04	25
trans-1,2-Dichloroethene	0.500	0.486		mg/kg wet		97.1	60 - 140	0.206	25
Methyl tert-butyl ether	0.500	0.444		mg/kg wet		88.7	79 - 127	2.34	25
1,1-Dichloroethane	0.500	0.491		mg/kg wet		98.2	60 - 140	1.21	25
cis-1,2-Dichloroethene	0.500	0.508		mg/kg wet		102	60 - 140	1.79	25
2,2-Dichloropropane	0.500	0.510		mg/kg wet		102	60 - 140	4.20	25
Bromochloromethane	0.500	0.502		mg/kg wet		100	60 - 140	3.23	25
Chloroform	0.500	0.518		mg/kg wet		104	60 - 140	1.72	25
Carbon tetrachloride	0.500	0.457		mg/kg wet		91.4	60 - 140	2.91	25
1,1,1-Trichloroethane	0.500	0.516		mg/kg wet		103	60 - 140	2.45	25
2-Butanone	2.50	1.94		mg/kg wet		77.8	60 - 140	9.04	25
1,1-Dichloropropene	0.500	0.486		mg/kg wet		97.3	60 - 140	1.02	25
Benzene	0.500	0.500		mg/kg wet		99.9	75.9 - 123	0.499	25
1,2-Dichloroethane (EDC)	0.500	0.518		mg/kg wet		104	60 - 140	1.65	25
Trichloroethene	0.500	0.513		mg/kg wet		103	82.7 - 120	1.36	25
Dibromomethane	0.500	0.476		mg/kg wet		95.1	60 - 140	1.05	25
1,2-Dichloropropane	0.500	0.488		mg/kg wet		97.6	60 - 140	0.918	25
Bromodichloromethane	0.500	0.506		mg/kg wet		101	60 - 140	5.57	25
cis-1,3-Dichloropropene	0.500	0.480		mg/kg wet		95.9	60 - 140	1.35	25
Toluene	0.500	0.468		mg/kg wet		93.6	77.3 - 126	3.67	25
4-Methyl-2-pentanone	2.50	2.05		mg/kg wet		81.8	60 - 140	7.37	25
trans-1,3-Dichloropropene	0.500	0.427		mg/kg wet		85.4	60 - 140	0.932	25
Tetrachloroethene	0.500	0.469		mg/kg wet		93.8	75 - 130	2.21	25
1,1,2-Trichloroethane	0.500	0.472		mg/kg wet		94.4	60 - 140	2.10	25
Dibromochloromethane	0.500	0.492		mg/kg wet		98.3	60 - 140	3.99	25
1,3-Dichloropropane	0.500	0.501		mg/kg wet		100	60 - 140	1.09	25
1,2-Dibromoethane	0.500	0.470		mg/kg wet		94.0	60 - 140	0.962	25
2-Hexanone	2.50	2.01		mg/kg wet		80.4	60 - 140	8.67	25
Ethylbenzene	0.500	0.457		mg/kg wet		91.4	80.7 - 120	0.654	25

TestAmerica Anchorage

# QC Sample Results

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

## Method: EPA 8260C - Volatile Organic Compounds by EPA Method 8260C (Continued)

Lab Sample ID: 14E0066-BS01

Matrix: Soil

Analysis Batch: 14E0066

Client Sample ID: Lab Control Sample Dup

Prep Type: Total

Prep Batch: 14E0066\_P

Analyte	Spike Added	LCS Dup Result	LCS Dup Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Chlorobenzene	0.500	0.481		mg/kg wet		96.2	80 - 120	2.06	25
1,1,1,2-Tetrachloroethane	0.500	0.508		mg/kg wet		102	60 - 140	2.24	25
m,p-Xylene	0.500	0.470		mg/kg wet		93.9	86.1 - 120	2.32	25
o-Xylene	0.500	0.476		mg/kg wet		95.3	85.3 - 120	1.97	25
Styrene	0.500	0.469		mg/kg wet		93.8	60 - 140	0.213	25
Bromoform	0.500	0.432		mg/kg wet		86.3	60 - 140	8.54	25
Isopropylbenzene	0.500	0.459		mg/kg wet		91.8	60 - 140	4.78	25
n-Propylbenzene	0.500	0.480		mg/kg wet		95.9	60 - 140	0.312	25
1,1,1,2-Tetrachloroethane	0.500	0.467		mg/kg wet		93.4	60 - 140	3.88	25
Bromobenzene	0.500	0.472		mg/kg wet		94.4	60 - 140	3.03	25
1,3,5-Trimethylbenzene	0.500	0.478		mg/kg wet		95.7	60 - 140	0.936	25
2-Chlorotoluene	0.500	0.476		mg/kg wet		95.2	60 - 140	0.524	25
1,2,3-Trichloropropane	0.500	0.463		mg/kg wet		92.6	60 - 140	3.40	25
4-Chlorotoluene	0.500	0.498		mg/kg wet		99.5	60 - 140	2.97	25
tert-Butylbenzene	0.500	0.502		mg/kg wet		100	60 - 140	2.75	25
1,2,4-Trimethylbenzene	0.500	0.470		mg/kg wet		94.1	60 - 140	0.952	25
sec-Butylbenzene	0.500	0.467		mg/kg wet		93.4	60 - 140	0.640	25
p-Isopropyltoluene	0.500	0.444		mg/kg wet		88.8	60 - 140	3.54	25
1,3-Dichlorobenzene	0.500	0.476		mg/kg wet		95.1	60 - 140	1.77	25
1,4-Dichlorobenzene	0.500	0.470		mg/kg wet		93.9	60 - 140	0.641	25
n-Butylbenzene	0.500	0.468		mg/kg wet		93.7	60 - 140	1.06	25
1,2-Dichlorobenzene	0.500	0.481		mg/kg wet		96.2	60 - 140	1.14	25
1,2-Dibromo-3-chloropropane	0.500	0.388		mg/kg wet		77.5	60 - 140	23.5	25
Hexachlorobutadiene	0.500	0.468		mg/kg wet		93.6	60 - 140	2.32	25
1,2,4-Trichlorobenzene	0.500	0.455		mg/kg wet		91.0	60 - 140	1.85	25
Naphthalene	0.500	0.436		mg/kg wet		87.2	58.8 - 130	4.37	25
1,2,3-Trichlorobenzene	0.500	0.444		mg/kg wet		88.9	60 - 140	6.00	25

Surrogate	LCS Dup %Recovery	LCS Dup Qualifier	Limits
Dibromofluoromethane	102		42.4 - 163
Toluene-d8	101		45.8 - 155
4-bromofluorobenzene	101		41.5 - 162
a,a,a - Trifluorotoluene	104		60 - 120

## Method: AK101 - Alaska - Gasoline Range Organics (GC)

Lab Sample ID: MB 230-471/1-A

Matrix: Solid

Analysis Batch: 475

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 471

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)	ND		3.3	mg/Kg		05/13/14 11:06	05/13/14 17:22	1
-C6-C10								

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene (fid)	108		50 - 150	05/13/14 11:06	05/13/14 17:22	1
BFB - FID	105		50 - 150	05/13/14 11:06	05/13/14 17:22	1

TestAmerica Anchorage



# QC Sample Results

Client: Ahnta Engineering Services LLC  
Project/Site: Ahnta Engineering Services

TestAmerica Job ID: 230-108-1

## Method: AK101 - Alaska - Gasoline Range Organics (GC) (Continued)

Lab Sample ID: LCS 230-471/4-A

Matrix: Solid

Analysis Batch: 475

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 471

Analyte			Spike	LCS	LCS	Unit	D	%Rec	%Rec.		
			Added	Result	Qualifier				Limits		
Gasoline Range Organics (GRO)			20.0	19.0		mg/Kg		95	60 - 120		
-C6-C10											
Surrogate	LCS		Limits								
	%Recovery	Qualifier									
a,a,a-Trifluorotoluene (fid)	122		50 - 150								
BFB - FID	128		50 - 150								

Lab Sample ID: LCSD 230-471/5-A

Matrix: Solid

Analysis Batch: 475

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 471

			Spike	LCSD	LCSD				%Rec.	RPD	
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Gasoline Range Organics (GRO)			20.0	20.1		mg/Kg	—	101	60 - 120	6	20
-C6-C10											
	LCSD	LCSD									
Surrogate	%Recovery	Qualifier	Limits								
a,a,a-Trifluorotoluene (fid)	131		50 - 150								
BFB - FID	125		50 - 150								

Lab Sample ID: 230-108-1 MS

Matrix: Solid

Analysis Batch: 486

Client Sample ID: 14-AKRE-Cuttings

Prep Type: Total/NA

Prep Batch: 471

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.		
	Result	Qualifier	Added	Result	Qualifier				Limits		
Gasoline Range Organics (GRO) -C6-C10	150		185	319		mg/Kg	☼	89	70 - 130		
Surrogate	MS %Recovery	MS Qualifier	Limits								
a,a,a-Trifluorotoluene (fid)	451	X	50 - 150								
BFB - FID	142		50 - 150								

Lab Sample ID: 230-108-1 MSD

Matrix: Solid

Analysis Batch: 486

Client Sample ID: 14-AKRE-Cuttings

Prep Type: Total/NA

Prep Batch: 471

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	RPD
	Result	Qualifier	Added	Result	Qualifier				Limits		
Gasoline Range Organics (GRO) -C6-C10	150		185	297		mg/Kg	☼	78	70 - 130	7	20
Surrogate	MSD %Recovery	MSD Qualifier	Limits								
a,a,a-Trifluorotoluene (fid)	422	X	50 - 150								
BFB - FID	131		50 - 150								

TestAmerica Anchorage

# QC Sample Results

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

## Method: AK101 - Alaska - Gasoline Range Organics (GC) (Continued)

Lab Sample ID: 230-108-1 DU

Matrix: Solid

Analysis Batch: 486

Client Sample ID: 14-AKRE-Cuttings

Prep Type: Total/NA

Prep Batch: 471

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Gasoline Range Organics (GRO)	150		139		mg/Kg	✖	10	
-C6-C10								
Surrogate	%Recovery	Qualifier	Limits					
a,a,a-Trifluorotoluene (fid)	255	X	50 - 150					
BFB - FID	132		50 - 150					

Lab Sample ID: MB 230-482/1-A

Matrix: Solid

Analysis Batch: 486

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 482

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)	ND		3.3	mg/Kg		05/14/14 11:33	05/14/14 15:50	1
-C6-C10								
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene (fid)	105		50 - 150			05/14/14 11:33	05/14/14 15:50	1
BFB - FID	107		50 - 150			05/14/14 11:33	05/14/14 15:50	1

Lab Sample ID: LCS 230-482/4-A

Matrix: Solid

Analysis Batch: 486

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 482

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits	
Gasoline Range Organics (GRO)	20.0	16.2		mg/Kg		81	60 - 120	
-C6-C10								
Surrogate	%Recovery	Qualifier	Limits					
a,a,a-Trifluorotoluene (fid)	86		50 - 150					
BFB - FID	110		50 - 150					

Lab Sample ID: LCSD 230-482/5-A

Matrix: Solid

Analysis Batch: 486

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 482

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Gasoline Range Organics (GRO)	20.0	19.7		mg/Kg		99	60 - 120	20	20
-C6-C10									
Surrogate	%Recovery	Qualifier	Limits						
a,a,a-Trifluorotoluene (fid)	114		50 - 150						
BFB - FID	108		50 - 150						

TestAmerica Anchorage

# QC Sample Results

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

## Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)

Lab Sample ID: MB 230-461/1-A

Matrix: Solid

Analysis Batch: 465

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 461

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
C10-C25	ND		20	mg/Kg		05/12/14 12:00	05/13/14 16:56	1
Surrogate	MB %Recovery	MB Qualifier	Limits			Prepared	Analyzed	Dil Fac
1-Chlorooctadecane	71		50 - 150			05/12/14 12:00	05/13/14 16:56	1

Lab Sample ID: LCS 230-461/2-A

Matrix: Solid

Analysis Batch: 477

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 461

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
C10-C25	127	99.6		mg/Kg		79	75 - 125
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
1-Chlorooctadecane	73		50 - 150				

Lab Sample ID: LCSD 230-461/3-A

Matrix: Solid

Analysis Batch: 465

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 461

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
C10-C25	127	98.1		mg/Kg		77	75 - 125	4	20
Surrogate	LCSD %Recovery	LCSD Qualifier	Limits						
1-Chlorooctadecane	75		50 - 150						

Lab Sample ID: 230-109-A-1-C MS

Matrix: Solid

Analysis Batch: 464

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Prep Batch: 461

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
C10-C25	120		143	243		mg/Kg	✖	83	75 - 125
Surrogate	MS %Recovery	MS Qualifier	Limits						
1-Chlorooctadecane	82		50 - 150						

Lab Sample ID: 230-109-A-1-D MSD

Matrix: Solid

Analysis Batch: 464

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Prep Batch: 461

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
C10-C25	120		143	237		mg/Kg	✖	79	75 - 125	3	20
Surrogate	MSD %Recovery	MSD Qualifier	Limits								
1-Chlorooctadecane	80		50 - 150								

TestAmerica Anchorage

## QC Sample Results

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

### Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC) (Continued)

Lab Sample ID: 230-109-A-1-B DU

Matrix: Solid

Analysis Batch: 464

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 461

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D ✖	RPD	Limit
C10-C25	120		122		mg/Kg		1	20
Surrogate	DU %Recovery	DU Qualifier	Limits					
1-Chlorooctadecane	75		50 - 150					

## QC Association Summary

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

### GCMS Volatiles

#### Analysis Batch: 14E0066

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
14E0066-BLK1	Method Blank	Total	Soil	EPA 8260C	14E0066_P
14E0066-BS1	Lab Control Sample	Total	Soil	EPA 8260C	14E0066_P
14E0066-BSD1	Lab Control Sample Dup	Total	Soil	EPA 8260C	14E0066_P
230-108-1	14-AKRE-Cuttings	Total	Solid	EPA 8260C	14E0066_P
230-108-2	14-AKRE-TB	Total	Solid	EPA 8260C	14E0066_P

#### Prep Batch: 14E0066\_P

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
14E0066-BLK1	Method Blank	Total	Soil	GC/MS Volatiles	
14E0066-BS1	Lab Control Sample	Total	Soil	GC/MS Volatiles	
14E0066-BSD1	Lab Control Sample Dup	Total	Soil	GC/MS Volatiles	
230-108-1	14-AKRE-Cuttings	Total	Solid	GC/MS Volatiles	
230-108-2	14-AKRE-TB	Total	Solid	GC/MS Volatiles	

### GC VOA

#### Prep Batch: 471

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
230-108-1	14-AKRE-Cuttings	Total/NA	Solid	5035	
230-108-1 DU	14-AKRE-Cuttings	Total/NA	Solid	5035	
230-108-1 MS	14-AKRE-Cuttings	Total/NA	Solid	5035	
230-108-1 MSD	14-AKRE-Cuttings	Total/NA	Solid	5035	
230-108-2	14-AKRE-TB	Total/NA	Solid	5035	
LCS 230-471/4-A	Lab Control Sample	Total/NA	Solid	5035	
LCSD 230-471/5-A	Lab Control Sample Dup	Total/NA	Solid	5035	
MB 230-471/1-A	Method Blank	Total/NA	Solid	5035	

#### Analysis Batch: 475

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
230-108-2	14-AKRE-TB	Total/NA	Solid	AK101	471
LCS 230-471/4-A	Lab Control Sample	Total/NA	Solid	AK101	471
LCSD 230-471/5-A	Lab Control Sample Dup	Total/NA	Solid	AK101	471
MB 230-471/1-A	Method Blank	Total/NA	Solid	AK101	471

#### Prep Batch: 482

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 230-482/4-A	Lab Control Sample	Total/NA	Solid	5035	
LCSD 230-482/5-A	Lab Control Sample Dup	Total/NA	Solid	5035	
MB 230-482/1-A	Method Blank	Total/NA	Solid	5035	

#### Analysis Batch: 486

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
230-108-1	14-AKRE-Cuttings	Total/NA	Solid	AK101	471
230-108-1 DU	14-AKRE-Cuttings	Total/NA	Solid	AK101	471
230-108-1 MS	14-AKRE-Cuttings	Total/NA	Solid	AK101	471
230-108-1 MSD	14-AKRE-Cuttings	Total/NA	Solid	AK101	471
LCS 230-482/4-A	Lab Control Sample	Total/NA	Solid	AK101	482
LCSD 230-482/5-A	Lab Control Sample Dup	Total/NA	Solid	AK101	482
MB 230-482/1-A	Method Blank	Total/NA	Solid	AK101	482

TestAmerica Anchorage

## QC Association Summary

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

### GC Semi VOA

#### Prep Batch: 461

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
230-108-1	14-AKRE-Cuttings	Total/NA	Solid	3545	
230-109-A-1-B DU	Duplicate	Total/NA	Solid	3545	
230-109-A-1-C MS	Matrix Spike	Total/NA	Solid	3545	
230-109-A-1-D MSD	Matrix Spike Duplicate	Total/NA	Solid	3545	
LCS 230-461/2-A	Lab Control Sample	Total/NA	Solid	3545	
LCSD 230-461/3-A	Lab Control Sample Dup	Total/NA	Solid	3545	
MB 230-461/1-A	Method Blank	Total/NA	Solid	3545	

#### Analysis Batch: 464

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
230-109-A-1-B DU	Duplicate	Total/NA	Solid	AK102 & 103	461
230-109-A-1-C MS	Matrix Spike	Total/NA	Solid	AK102 & 103	461
230-109-A-1-D MSD	Matrix Spike Duplicate	Total/NA	Solid	AK102 & 103	461

#### Analysis Batch: 465

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 230-461/3-A	Lab Control Sample Dup	Total/NA	Solid	AK102 & 103	461
MB 230-461/1-A	Method Blank	Total/NA	Solid	AK102 & 103	461

#### Analysis Batch: 477

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
230-108-1	14-AKRE-Cuttings	Total/NA	Solid	AK102 & 103	461
LCS 230-461/2-A	Lab Control Sample	Total/NA	Solid	AK102 & 103	461

### General Chemistry

#### Analysis Batch: 460

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
230-108-1	14-AKRE-Cuttings	Total/NA	Solid	Moisture	
230-108-2	14-AKRE-TB	Total/NA	Solid	Moisture	
230-109-A-2 DU	Duplicate	Total/NA	Solid	Moisture	

### Wet Chem

#### Analysis Batch: 14E0076

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
230-108-1	14-AKRE-Cuttings	Total	Solid	TA SOP	14E0076_P
230-108-2	14-AKRE-TB	Total	Solid	TA SOP	14E0076_P

#### Prep Batch: 14E0076\_P

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
230-108-1	14-AKRE-Cuttings	Total	Solid	Wet Chem	
230-108-2	14-AKRE-TB	Total	Solid	Wet Chem	



## Lab Chronicle

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

### Client Sample ID: 14-AKRE-Cuttings

Date Collected: 05/09/14 16:30

Date Received: 05/09/14 17:00

### Lab Sample ID: 230-108-1

Matrix: Solid

Percent Solids: 93

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total	Prep	GC/MS Volatiles		0.291	14E0066_P	05/13/14 13:08	CBW	TAL SPK
Total	Analysis	EPA 8260C		10.0	14E0066	05/13/14 15:32	CBW	TAL SPK
Total/NA	Prep	5035			471	05/13/14 11:06	ASD	TAL ANC
Total/NA	Analysis	AK101		1	486	05/14/14 18:45	ASD	TAL ANC
Total/NA	Prep	3545			461	05/12/14 12:00	KDC	TAL ANC
Total/NA	Analysis	AK102 & 103		20	477	05/14/14 13:45	KDC	TAL ANC
Total/NA	Analysis	Moisture		1	460	05/12/14 09:55	KDC	TAL ANC
Total	Prep	Wet Chem		1.00	14E0076_P	05/11/14 09:55	RA	TAL SPK
Total	Analysis	TA SOP		1.00	14E0076	05/12/14 09:55	RA	TAL SPK

### Client Sample ID: 14-AKRE-TB

Date Collected: 05/09/14 16:00

Date Received: 05/09/14 17:00

### Lab Sample ID: 230-108-2

Matrix: Solid

Percent Solids: 100

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total	Prep	GC/MS Volatiles		1.00	14E0066_P	05/13/14 13:08	CBW	TAL SPK
Total	Analysis	EPA 8260C		1.00	14E0066	05/13/14 15:55	CBW	TAL SPK
Total/NA	Prep	5035			471	05/13/14 11:06	ASD	TAL ANC
Total/NA	Analysis	AK101		1	475	05/13/14 16:54	ASD	TAL ANC
Total/NA	Analysis	Moisture		1	460	05/12/14 09:55	KDC	TAL ANC

#### Laboratory References:

TAL ANC = TestAmerica Anchorage, 2000 West International Airport Road, Suite A10, Anchorage, AK 99502-1119, TEL (907)563-9200

TAL SPK = TestAmerica Spokane, 11922 East 1st. Avenue, Spokane, WA 99206, TEL (509)924-9200

## Certification Summary

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

### Laboratory: TestAmerica Anchorage

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	AK00975	06-30-14
Alaska (UST)	State Program	10	UST-067	06-16-14

### Laboratory: TestAmerica Spokane

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska (UST)	State Program	10	UST-071	10-31-14
Washington	State Program	10	C569	01-06-15

## Method Summary

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

Method	Method Description	Protocol	Laboratory
EPA 8260C	Volatile Organic Compounds by EPA Method 8260C		TAL SPK
AK101	Alaska - Gasoline Range Organics (GC)	ADEC	TAL ANC
AK102 & 103	Alaska - Diesel Range Organics & Residual Range Organics (GC)	ADEC	TAL ANC
Moisture	Percent Moisture	EPA	TAL ANC
TA SOP	Conventional Chemistry Parameters by APHA/EPA Methods		TAL SPK

### Protocol References:

ADEC = Alaska Department of Environmental Conservation

EPA = US Environmental Protection Agency

### Laboratory References:

TAL ANC = TestAmerica Anchorage, 2000 West International Airport Road, Suite A10, Anchorage, AK 99502-1119, TEL (907)563-9200

TAL SPK = TestAmerica Spokane, 11922 East 1st. Avenue, Spokane, WA 99206, TEL (509)924-9200

## Sample Summary

Client: Ahtna Engineering Services LLC  
Project/Site: Ahtna Engineering Services

TestAmerica Job ID: 230-108-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
230-108-1	14-AKRE-Cuttings	Solid	05/09/14 16:30	05/09/14 17:00
230-108-2	14-AKRE-TB	Solid	05/09/14 16:00	05/09/14 17:00

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# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING



230-108 Chain of Custody

2000

124-1317	253-922-2310	FAX 922-5047
06-5302	509-924-9200	FAX 924-9290
108-7145	503-906-9200	FAX 906-9210
02-1119	907-563-9200	FAX 563-9210

## CHAIN OF CUSTODY REPORT

Work Order #: 230-108

CLIENT: <b>AES</b>		INVOICE TO: <b>Ahtna Engineering Services, 3100 Beacon Blvd</b>		<b>TURNAROUND REQUEST</b> in Business Days * Organic & Inorganic Analyses <input type="checkbox"/> 10 <input type="checkbox"/> 7 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> <1 STD. Petroleum Hydrocarbon Analyses <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> <1 STD. <input type="checkbox"/> OTHER Specify: * Turnaround Requests less than standard may incur Rush Charges.			
REPORT TO: <b>Olga Stewart</b>		P.O. NUMBER: <b>20266.008</b>					
ADDRESS: <b>110 W. 38th Ave. 99503</b>		PRESERVATIVE					
PHONE: <b>646.2969</b> FAX: _____		REQUESTED ANALYSES					
PROJECT NAME: <b>AK Real Estate</b>		PROJECT NUMBER: <b>20266.008</b>					
SAMPLED BY: <b>Olga Stewart</b>							
CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	GR0 101	VOCs 8260	DRO 102			
1 14-ACRE-CUTTINGS	5/9/14 14:30	X	X	X			
2 14-ACRE-TB	5/9/14 16:00	X	X				
3							
4							
5							
6							
7							
8							
9							
10							
RELEASED BY: <b>Olga Stewart</b>	FIRM: <b>AES</b>	DATE: <b>5/9/14</b>	TIME: <b>17:00</b>	RECEIVED BY: <b>Andrew Pich</b>	FIRM: <b>TA-AK</b>	DATE: <b>5/9/14</b>	TIME: <b>17:00</b>
PRINT NAME: _____	FIRM: _____	DATE: _____	TIME: _____	PRINT NAME: _____	FIRM: _____	DATE: _____	TIME: _____
ADDITIONAL REMARKS: <b>Hot!</b>						TEMP: <b>15.8</b>	PAGE <b>1</b> OF <b>1</b>

TAL-1000 (0612)



TestAmerica  
THE LEADER IN ENVIRONMENTAL TESTING  
654340

*Custody Seal*

DATE

5/9/14

SIGNATURE



230-108

TestAmerica  
THE LEADER IN ENVIRONMENTAL TESTING  
654340



## Login Sample Receipt Checklist

Client: Ahtna Engineering Services LLC

Job Number: 230-108-1

Login Number: 108

List Source: TestAmerica Anchorage

List Number: 1

Creator: Pilch, Andrew C

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	Received same day of collection; chilling process has begun.
Cooler Temperature is recorded.	True	15.8 C
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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## Laboratory Data Review Checklist

Completed by:

Title:  Date:

CS Report Name:  Report Date:

Consultant Firm:

Laboratory Name:  Laboratory Report Number:

ADEC File Number:  ADEC RecKey Number:

### 1. Laboratory

- a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?  
**X Yes**      No      NA (Please explain.)      Comments:

- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?  
**X Yes**      No      NA (Please explain.)      Comments:

### 2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?  
**X Yes**      No      NA (Please explain.)      Comments:

- b. Correct analyses requested?  
**X Yes**      No      NA (Please explain.)      Comments:

### 3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ( $4^{\circ} \pm 2^{\circ} \text{C}$ )?  
**X Yes**      No      NA (Please explain.)      Comments:

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?  
**X Yes**      No      NA (Please explain.)      Comments:

- c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?  
**X Yes**      No      NA (Please explain.)      Comments:

No issues with sample condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?  
**X Yes**      No      NA (Please explain.)      Comments:

Field filtered samples were received containing solid material.

- e. Data quality or usability affected? (Please explain.)      Comments:

Data quality and usability is not affected.

#### 4. Case Narrative

- a. Present and understandable?  
**X Yes**      No      NA (Please explain.)      Comments:

- b. Discrepancies, errors or QC failures identified by the lab?  
Yes      No      **X NA** (Please explain.)      Comments:

There were no discrepancies or errors noted.

- c. Were all corrective actions documented?  
Yes      No      **X NA** (Please explain.)      Comments:

There were no corrective actions noted.

- d. What is the effect on data quality/usability according to the case narrative?      Comments:

Data quality and usability is not affected.

#### 5. Samples Results

- a. Correct analyses performed/reported as requested on COC?  
**X Yes**      No      NA (Please explain.)      Comments:

- b. All applicable holding times met?  
**X Yes**      No      NA (Please explain.)      Comments:

- c. All soils reported on a dry weight basis?  
Yes No **X** NA (Please explain.) Comments:

This SDG does not include any soil samples.

- d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?  
Yes **X** No NA (Please explain.) Comments:

Two samples (MW5 and MW6) required dilution that elevated the PQL of TCE, 1,1-DCE, and VC to greater than the Cleanup Level. Ahtna requested that those samples/analytes be reported to the MDL. The MDL (5.5 ug/L) remained greater than the PQL (5 ug/L) for the two samples for TCE.

- e. Data quality or usability affected? Comments:

Data quality or usability is not affected.

## 6. QC Samples

### a. Method Blank

- i. One method blank reported per matrix, analysis and 20 samples?  
**X** Yes No NA (Please explain.) Comments:

- ii. All method blank results less than PQL?  
**X** Yes No NA (Please explain.) Comments:

- iii. If above PQL, what samples are affected? Comments:

No results are greater than the PQL.

- iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?  
Yes No **X** NA (Please explain.) Comments:

No samples are affected.

- v. Data quality or usability affected? (Please explain.) Comments:

Data quality and usability is not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

- i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

**X Yes**      No      NA (Please explain.)      Comments:

- ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

**X Yes**      No      NA (Please explain.)      Comments:

- iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

**X Yes**      No      NA (Please explain.)      Comments:

- iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

**X Yes**      No      NA (Please explain.)      Comments:

- v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

% R and RPD are within acceptable limits.

- vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes      No      **X**      NA (Please explain.)      Comments:

No samples are affected.

- vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality and usability are not affected.

c. Surrogates – Organics Only

- i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

**X Yes**      No      NA (Please explain.)      Comments:



- ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

**X Yes**      No      NA (Please explain.)      Comments:

- iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

Yes      No      **X NA** (Please explain.)      Comments:

No samples have failed surrogate recoveries.

- iv. Data quality or usability affected? (Use the comment box to explain.)

Comments:

Data quality and usability are not affected.

- d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

- i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

**X Yes**      No      NA (Please explain.)      Comments:

- ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes      **X No**      NA (Please explain.)      Comments:

All VOA samples were shipped in one cooler.

- iii. All results less than PQL?

**X Yes**      No      NA (Please explain.)      Comments:

- iv. If above PQL, what samples are affected?

Comments:

No results are greater than the PQL.

- v. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability are not affected.

e. Field Duplicate

- i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes ☒ No ☐ NA (Please explain.)

Comments:

Two field duplicates were submitted for analysis of VOCs (MW60, MW80).  
Per the approved work plan, field duplicates were not submitted for analysis of the MNA parameters: TOC, Nitrate/Nitrite, Sulfate, Total Iron, Methane, Ethane, or Ethene.

- ii. Submitted blind to lab?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

- iii. Precision – All relative percent differences (RPD) less than specified DQOs?  
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where  $R_1$  = Sample Concentration

$R_2$  = Field Duplicate Concentration

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

RPD could only be calculated for PCE. All other analytes were non-detect.

- iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and usability is not affected.

f. Decontamination or Equipment Blank (If not used explain why).

Yes ☒ No ☐ NA (Please explain.)

Comments:

Per the approved work plan, equipment blanks were not submitted.

- i. All results less than PQL?

Yes ☐ No ☒ NA (Please explain.)

Comments:

Equipment blanks not used.

- ii. If above PQL, what samples are affected?

Comments:

Equipment blanks not used.

iii. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability is not affected.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

**X Yes**

No

NA (Please explain.)

Comments:

Some results flagged as “J” as estimated because the result is greater than the MDL but less than the PQL.

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## Laboratory Data Review Checklist

Completed by:

Title:

Date:

CS Report Name:

Report Date:

Consultant Firm:

Laboratory Name:

Laboratory Report Number:

ADEC File Number:

ADEC RecKey Number:

### 1. Laboratory

- a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?  
Yes ☒ No ☐ NA (Please explain.)      Comments:

- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?  
Yes ☐ No ☒ NA (Please explain.)      Comments:

### 2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?  
☒ Yes ☐ No ☐ NA (Please explain.)      Comments:

- b. Correct analyses requested?  
☒ Yes ☐ No ☐ NA (Please explain.)      Comments:

### 3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ( $4^{\circ} \pm 2^{\circ} \text{C}$ )?  
☒ Yes ☐ No ☐ NA (Please explain.)      Comments:

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?  
☒ Yes ☐ No ☐ NA (Please explain.)      Comments:

- c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?  
**X Yes**      No      NA (Please explain.)      Comments:

No issues with sample condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?  
Yes      No      **X NA** (Please explain.)      Comments:

No discrepancies documented.

- e. Data quality or usability affected? (Please explain.)      Comments:

Data quality and usability is not affected.

#### 4. Case Narrative

- a. Present and understandable?  
Yes      **X No**      NA (Please explain.)      Comments:

No narrative provided.

- b. Discrepancies, errors or QC failures identified by the lab?  
Yes      No      **X NA** (Please explain.)      Comments:

There were no discrepancies or errors noted.

- c. Were all corrective actions documented?  
Yes      No      **X NA** (Please explain.)      Comments:

There were no corrective actions noted.

- d. What is the effect on data quality/usability according to the case narrative?      Comments:

Data quality and usability is not affected.

#### 5. Samples Results

- a. Correct analyses performed/reported as requested on COC?  
**X Yes**      No      NA (Please explain.)      Comments:

- b. All applicable holding times met?  
**X Yes**      No      NA (Please explain.)      Comments:



c. All soils reported on a dry weight basis?  
Yes    No    **X** **NA** (Please explain.)    Comments:

This SDG does not include any soil samples.

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?  
Yes    No    **X** **NA** (Please explain.)    Comments:

There are no DQOs for Dhc or VC PQLs.

e. Data quality or usability affected?    Comments:

Data quality or usability is not affected.

6. QC Samples

a. Method Blank  
i. One method blank reported per matrix, analysis and 20 samples?  
**X** **Yes**    No    **NA** (Please explain.)    Comments:

Called DNA Extraction Blank.

ii. All method blank results less than PQL?  
**X** **Yes**    No    **NA** (Please explain.)    Comments:

iii. If above PQL, what samples are affected?    Comments:

No samples affected.

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?  
Yes    No    **X** **NA** (Please explain.)    Comments:

No samples are affected.

v. Data quality or usability affected? (Please explain.)    Comments:

Data quality and usability is not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

- i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes ☒ No ☐ NA (Please explain.)

Comments:

LCS called positive control. LCSD not reported.

- ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes ☒ No ☐ NA (Please explain.)

Comments:

No metals or inorganics in this SDG.

- iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes ☐ No ☒ NA (Please explain.)

Comments:

Accuracies are within laboratory control range – reported as “passed.”

- iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

Precisions are within laboratory control range – reported as “passed.”

- v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

NA

- vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes ☐ No ☒ NA (Please explain.)

Comments:

No samples are affected.

- vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality and usability are not affected.

c. Surrogates – Organics Only

- i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

Yes ☒ No ☐ NA (Please explain.)

Comments:

- ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes ☒ No ☐ NA (Please explain.)

Comments:

- iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

Yes ☐ No ☒ NA (Please explain.)

Comments:

NA

- iv. Data quality or usability affected? (Use the comment box to explain.)

Comments:

Data quality and usability are not affected.

- d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

- i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes ☐ No ☒ NA (Please explain.)

Comments:

Trip blank not necessary for Dhc or VC.

- ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes ☐ No ☒ NA (Please explain.)

Comments:

No trip blanks included.

- iii. All results less than PQL?

Yes ☐ No ☒ NA (Please explain.)

Comments:

No trip blanks included.

- iv. If above PQL, what samples are affected?

Comments:

No trip blanks included.

- v. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability are not affected.

e. Field Duplicate

- i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes ☒ No ☐ NA (Please explain.)

Comments:

Per the approved work plan, field duplicates were not submitted for analysis of CSIA.

- ii. Submitted blind to lab?

Yes ☐ No ☒ NA (Please explain.)

Comments:

No field duplicate.

- iii. Precision – All relative percent differences (RPD) less than specified DQOs?  
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where  $R_1$  = Sample Concentration

$R_2$  = Field Duplicate Concentration

Yes ☐ No ☒ NA (Please explain.)

Comments:

No field duplicate.

- iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and usability is not affected.

f. Decontamination or Equipment Blank (If not used explain why).

Yes ☒ No ☐ NA (Please explain.)

Comments:

Per the approved work plan, equipment blanks were not submitted.

- i. All results less than PQL?

Yes ☐ No ☒ NA (Please explain.)

Comments:

Equipment blanks not used.

- ii. If above PQL, what samples are affected?

Comments:

Equipment blanks not used.

- iii. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability is not affected.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

**X Yes**

No

NA (Please explain.)

Comments:

Some results are flagged as “U” as not detected at the quantification limit.
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## Laboratory Data Review Checklist

Completed by:

Title:  Date:

CS Report Name:  Report Date:

Consultant Firm:

Laboratory Name:  Laboratory Report Number:

ADEC File Number:  ADEC RecKey Number:

### 1. Laboratory

- a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?  
Yes ☒ No ☐ NA (Please explain.) Comments:

- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?  
Yes ☐ No ☒ NA (Please explain.) Comments:

### 2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?  
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

- b. Correct analyses requested?  
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

### 3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ( $4^{\circ} \pm 2^{\circ} \text{C}$ )?  
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?  
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

- c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?  
**X Yes**      No      NA (Please explain.)      Comments:

No issues with sample condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?  
**X Yes**      No      NA (Please explain.)      Comments:

Naming did not match the COC.

- e. Data quality or usability affected? (Please explain.)      Comments:

Data quality and usability is not affected.

#### 4. Case Narrative

- a. Present and understandable?  
Yes      **X No**      NA (Please explain.)      Comments:

No narrative provided.

- b. Discrepancies, errors or QC failures identified by the lab?  
Yes      No      **X NA** (Please explain.)      Comments:

There were no discrepancies or errors noted.

- c. Were all corrective actions documented?  
Yes      No      **X NA** (Please explain.)      Comments:

There were no corrective actions noted.

- d. What is the effect on data quality/usability according to the case narrative?      Comments:

Data quality and usability is not affected.

#### 5. Samples Results

- a. Correct analyses performed/reported as requested on COC?  
**X Yes**      No      NA (Please explain.)      Comments:

- b. All applicable holding times met?  
**X Yes**      No      NA (Please explain.)      Comments:

c. All soils reported on a dry weight basis?  
Yes No **X** NA (Please explain.) Comments:

This SDG does not include any soil samples.

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?  
Yes No **X** NA (Please explain.) Comments:

There are no DQOs for CSIA PQLs.

e. Data quality or usability affected? Comments:

Data quality or usability is not affected.

6. QC Samples

a. Method Blank  
i. One method blank reported per matrix, analysis and 20 samples?  
Yes **X** No NA (Please explain.) Comments:

Method blanks are not reported.

ii. All method blank results less than PQL?  
Yes No **X** NA (Please explain.) Comments:

No method blanks reported.

iii. If above PQL, what samples are affected? Comments:

No method blanks reported.

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?  
Yes No **X** NA (Please explain.) Comments:

No samples are affected.

v. Data quality or usability affected? (Please explain.) Comments:

Data quality and usability is not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

- i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

**X** Yes      No      NA (Please explain.)      Comments:

- ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes **X** No      NA (Please explain.)      Comments:

No metals or inorganics in this SDG.

- iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes      No      **X** NA (Please explain.)      Comments:

%R are not reported.

- iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

**X** Yes      No      NA (Please explain.)      Comments:

Precisions are within laboratory control range.

- v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

NA

- vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes      No      **X** NA (Please explain.)      Comments:

No samples are affected.

- vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality and usability are not affected.

c. Surrogates – Organics Only

- i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

Yes **X** No      NA (Please explain.)      Comments:

- ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes ☒ No ☐ NA (Please explain.)

Comments:

- iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

Yes ☐ No ☒ NA (Please explain.)

Comments:

NA

- iv. Data quality or usability affected? (Use the comment box to explain.)

Comments:

Data quality and usability are not affected.

- d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

- i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes ☐ No ☒ NA (Please explain.)

Comments:

Trip blank not necessary for CSIA.

- ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes ☐ No ☒ NA (Please explain.)

Comments:

No trip blanks included.

- iii. All results less than PQL?

Yes ☐ No ☒ NA (Please explain.)

Comments:

No trip blanks included.

- iv. If above PQL, what samples are affected?

Comments:

No trip blanks included.

- v. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability are not affected.

e. Field Duplicate

- i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes ☒ No ☐ NA (Please explain.)

Comments:

Per the approved work plan, field duplicates were not submitted for analysis of CSIA.

- ii. Submitted blind to lab?

Yes ☐ No ☒ NA (Please explain.)

Comments:

No field duplicate.

- iii. Precision – All relative percent differences (RPD) less than specified DQOs?  
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where  $R_1$  = Sample Concentration

$R_2$  = Field Duplicate Concentration

Yes ☐ No ☒ NA (Please explain.)

Comments:

No field duplicate.

- iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and usability is not affected.

f. Decontamination or Equipment Blank (If not used explain why).

Yes ☒ No ☐ NA (Please explain.)

Comments:

Per the approved work plan, equipment blanks were not submitted.

- i. All results less than PQL?

Yes ☐ No ☒ NA (Please explain.)

Comments:

Equipment blanks not used.

- ii. If above PQL, what samples are affected?

Comments:

Equipment blanks not used.

- iii. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability is not affected.



7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

**X Yes**

No

NA (Please explain.)

Comments:

One result is flagged as "J" as usable only to $\pm 2\%$ .
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## Laboratory Data Review Checklist

Completed by:

Title:  Date:

CS Report Name:  Report Date:

Consultant Firm:

Laboratory Name:  Laboratory Report Number:

ADEC File Number:  ADEC RecKey Number:

### 1. Laboratory

- a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?  
**X Yes**      No      NA (Please explain.)      Comments:

- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?  
**X Yes**      No      NA (Please explain.)      Comments:

### 2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?  
**X Yes**      No      NA (Please explain.)      Comments:

- b. Correct analyses requested?  
**X Yes**      No      NA (Please explain.)      Comments:

### 3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ( $4^{\circ} \pm 2^{\circ} \text{C}$ )?  
Yes **X** No      NA (Please explain.)      Comments:

Samples were received immediately following collection and did not have time to chill to a preserved temperature until after receipt by the laboratory.

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

**X Yes**

No

NA (Please explain.)

Comments:

- c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

**X Yes**

No

NA (Please explain.)

Comments:

No issues with sample condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

**X Yes**

No

NA (Please explain.)

Comments:

Temperature discrepancy noted.

- e. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability is not affected.

#### 4. Case Narrative

- a. Present and understandable?

**X Yes**

No

NA (Please explain.)

Comments:

- b. Discrepancies, errors or QC failures identified by the lab?

**X Yes**

No

NA (Please explain.)

Comments:

- c. Were all corrective actions documented?

**X Yes**

No

NA (Please explain.)

Comments:

- d. What is the effect on data quality/usability according to the case narrative?

Comments:

Data quality and usability is not affected.

#### 5. Samples Results

- a. Correct analyses performed/reported as requested on COC?

**X Yes**

No

NA (Please explain.)

Comments:

b. All applicable holding times met?

☒ Yes

No

NA (Please explain.)

Comments:

c. All soils reported on a dry weight basis?

☒ Yes

No

NA (Please explain.)

Comments:

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

Yes

No

☒ NA (Please explain.)

Comments:

Sample used for waste characterization only – no DQOs for cleanup level.

e. Data quality or usability affected?

Comments:

Data quality or usability is not affected.

## 6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

☒ Yes

No

NA (Please explain.)

Comments:

ii. All method blank results less than PQL?

☒ Yes

No

NA (Please explain.)

Comments:

iii. If above PQL, what samples are affected?

Comments:

No results are greater than the PQL.

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?

Yes

No

☒ NA (Please explain.)

Comments:

No samples are affected.

v. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability is not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

- i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

**X** Yes      No      NA (Please explain.)      Comments:

- ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes      No      **X**      NA (Please explain.)      Comments:

No metals or inorganics included in this SDG.

- iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

**X** Yes      No      NA (Please explain.)      Comments:

- iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

**X** Yes      No      NA (Please explain.)      Comments:

- v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

% R and RPD are within acceptable limits.

- vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes      No      **X**      NA (Please explain.)      Comments:

No samples are affected.

- vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality and usability are not affected.

c. Surrogates – Organics Only

- i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

**X** Yes      No      NA (Please explain.)      Comments:



- ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes ☒ No ☐ NA (Please explain.)

Comments:

%R of fid for Method AK 101, sample 14-AKRE-Cuttings was outside acceptable limits.

- iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The GRO result for sample 14-AKRE-Cuttings is flagged “J” as estimated due to QC criteria not being met.

- iv. Data quality or usability affected? (Use the comment box to explain.)

Comments:

Data quality and usability are not affected.

- d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

- i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

- ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes ☒ No ☐ NA (Please explain.)

Comments:

All samples were shipped in one cooler.

- iii. All results less than PQL?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

- iv. If above PQL, what samples are affected?

Comments:

No results are greater than the PQL.

- v. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability are not affected.

e. Field Duplicate

- i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes ☒ No ☐ NA (Please explain.)

Comments:

Per the approved work plan, a field duplicate was not submitted for the waste characterization sample.

- ii. Submitted blind to lab?

Yes ☐ No ☒ NA (Please explain.)

Comments:

No field duplicate.

- iii. Precision – All relative percent differences (RPD) less than specified DQOs?  
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where  $R_1$  = Sample Concentration

$R_2$  = Field Duplicate Concentration

Yes ☐ No ☒ NA (Please explain.)

Comments:

No field duplicate.

- iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and usability is not affected.

f. Decontamination or Equipment Blank (If not used explain why).

Yes ☒ No ☐ NA (Please explain.)

Comments:

Equipment blanks were not submitted – all sample materials were disposable.

- i. All results less than PQL?

Yes ☐ No ☒ NA (Please explain.)

Comments:

Equipment blanks not used.

- ii. If above PQL, what samples are affected?

Comments:

Equipment blanks not used.

- iii. Data quality or usability affected? (Please explain.)

Data quality and usability is not affected.

Comments:

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

**X** Yes

No

NA (Please explain.)

Comments:

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## **APPENDIX F**

### **DATALOGGER DATA**

**(PROVIDED IN NATIVE EXCEL FILE ONLY)**

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